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British Fern Gazette.

PUBLISHED QUARTERLY.

September, 1909.

EDITED BY

CHARLES T. DRUERY, V.M.H., F.L.S.

PUBLISHED BY

THE BRITISH PTERIDOLOGICAL SOCIETY

(Secretary: Mr. G. WHITWELL, *Serpentine Cottage*),

KENDAL, WESTMORELAND.

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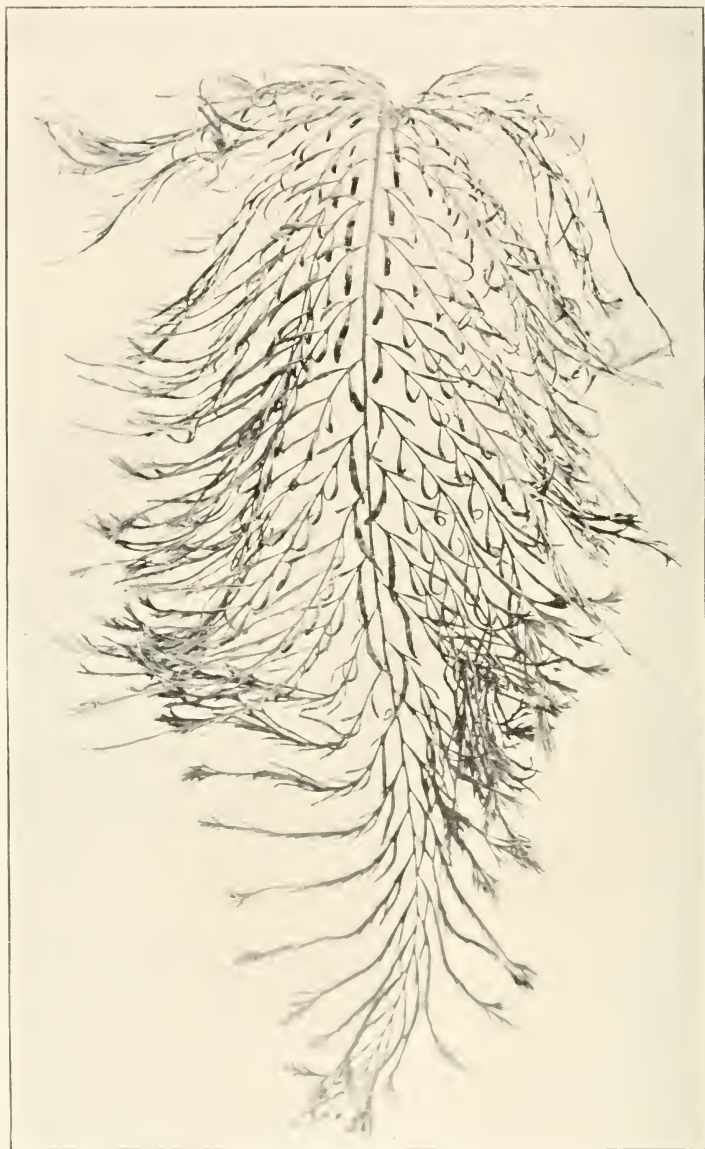
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N.B.—Partly inevitably, partly accidentally, the whole of this number is from the editorial pen, the next issue, however, will contain interesting contributions by Dr. F. W. Stansfield, Mr. G. Whitwell, and, it is hoped, other lovers of the cult.—ED.

PREFACE.

A resolution was passed on August 2nd, 1909, at the annual meeting of the British Pteridological Society at Kendal, at the suggestion of Mr. Chas. T. Druery, V.M.H., F.L.S., that a quarterly publication should be established and issued dealing with British species of Ferns, particularly from the varietal point of view. For many years the encouragement of this special "cult" has been the object of the Society, but as its records simply embraced reports of the annual meetings, with only occasional additional contributions of papers by the members, it was felt that its utility was too circumscribed, and that in view of the fact of the immensely increased popularity of the varietal forms as decorative plants, it was essential to arrange for greater publicity, and the periodical issue of such a "Gazette" as that of which this number forms the first issue. To the existing members of the "cult" it is unnecessary to dilate upon the wonderful development in British Fern varieties, which has been brought about

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by new "finds" and selective culture during more than half a century since they last enjoyed popularity, but to those outside the society, it may be well to state that at the period indicated, the thoroughbred wild finds or "sports" were comparatively few in number, and that, very unwisely, a considerable number of inferior, defective, and inconstant forms were propagated and distributed with the inevitable result that the really beautiful forms were swamped. For this reason popularity declined, and eventually the cult was only pursued by a small coterie of enthusiastic fern hunters, raisers, and selectors who maintained collections, and by new discoveries and fortunate sowings have gradually accumulated such an immense amount of material that the new era of popularity is little likely to wane for the same reason as previously.

The late Mr. E. J. Lowe's list of British Ferns, published in 1891, records and describes nearly two thousand distinct forms, to which many have been added since. From this list and the subsequent acquisitions, the Society compiled in 1901 "The Book of British Ferns," which confined itself entirely to the thoroughbred, symmetrical, and constant varieties which it deemed worthy of cultivation. This book, which is profusely illustrated and deals in separate sections with both the popular and scientific side of the "cult," brought the records up to the said date, and is obtainable either from the Secretary, or Messrs. Newnes, price 3/6, post free 3/9.

The literature of British Ferns is fairly copious, but in the great majority of cases only deals with the normal ferns, and hence, from the Society's point of view, may be largely ignored. The exceptions are Britten's "European Ferns," Moore's "Nature Printed Ferns," 1859, E. J. Lowe's, "Our Native Ferns," 1867 (2 vols.), "New and Rare Ferns" (1 vol.), and the small pocket list already mentioned, "British Ferns," 1891, plus those above alluded to. It may, however, be confidently asserted that the "Book of British Ferns," which is profusely illustrated, is the only one which deals, from the

expert's point of view, with the best forms comprehensively up to a recent date, and also gives in an appendix an account of the remarkable results of their scientific study.

The object of the present "Gazette" is to bring these records up to date, and to this end all lovers of fern "sports" are invited to send to the Editor full particulars of new "finds" or fresh acquisitions obtained by selective culture, sending fronds for consideration. These will be acknowledged by post in any case, *provided stamps be sent for reply*, and a record will appear in the "Gazette" if quality justifies it. A reminder may be given that it is the aim of the Society to lead up to and encourage better and better types, and, in view of the abundance of good material, to discourage inferior ones; an object which the Editor will strictly adhere to. An exchange column is contemplated, but we reserve this question for the time being, contenting ourselves in this issue with a cordial invitation to all British fern lovers to send us any suggestions or matter for publication which they may consider in the interest of the cult, and within the scope of this "Gazette."

CHAS. T. DRUERY, V.M.H., F.L.S.,

Stanwixbank, Shaa Road,

Editor.

Acton, London, W.

P.S.—The Editor requests that this number may be taken as an indication to those many friends who promised their support that their names have been placed on the list of subscribers, and, at the same time, of members of the British Pteridological Society, and that their subscription, 5/- per annum (embracing four issues of the "Gazette"), should be remitted to the Secretary, Mr. George Whitwell, Serpentine College, Kendal; or to the Editor, as above.

OUR FRONTISPIECE.

The Fern frond depicted on our frontispiece* represents undoubtedly one of the most remarkable "jumps" in selective Fern evolution, as will be seen by a comparison

* From a photograph kindly provided by Mr. C. B. Green.

with a portion of a frond of the parent plant. The said parent *Polystichum aculeatum pulcherrimum* was found nearly forty years ago by a farm labourer in a Dorsetshire hedge, and since that time has only been propagated by



POLYSTICHUM ACULEATUM PULCHERRIMUM.

offsets owing to its infertility as regards spores. A few years back, however, a few spores were found, and Mr. C. B. Green, of Acton, and the Editor made a joint sowing, with the remarkable result that about twenty plants of altogether different types resulted amid a number of the

parental form, and a few reversions towards the normal. The photo reproduced represents so far the most extraordinary of these secondary "sports," but several of the others are of wonderful delicacy of cutting, the parental half-inch pinnacles being extended sometimes to nearly three inches, and of almost hairlike tenuity. Two have obtained first class certificates from the Royal Horticultural Society, and a third, which is on quite different lines, and is finely dissected and plumose, an award of merit. The appearance of these varieties established an altogether new section among varietal Shield Ferns, and constitutes an unique example among secondary sports.

C. T. D.

OUR NATIVE FERNS.

Although the rider of every hobby is apt to exaggerate its importance, it is absolutely safe to say that amongst all branches of the gardening hobby, that relating to our native ferns in their varietal forms is unique in interest. The British Isles, compared to many tropical or sub-tropical fern lands, are poor in species, numbering only some forty odd as against hundreds, but for some reason so far inscrutable these few species have proved themselves to be capable of assuming so many sportive forms as to far and away exceed, in varietal diversity, all the rest of the ferns of the world put together. This may, perhaps, be partly imputed to the fact that while exotic ferns, of which so many species have been introduced, have mainly been discovered by general botanists who do not individually examine the great numbers of plants they meet with, with a view to discover the comparatively rare "sports," our home ferns have been for more than half a century subjected to that special and persevering search by expert fern hunters, which is alone qualified to earn success by the discovery of new forms. It is a common thing to hear from persons who have been visiting our ferny districts that "ferns were there in thousands but only the common ones," in obvious ignorance of the fact that wherever these

common or normal forms abound, there is a chance of finding a "sport" and that when such a "sport" is discovered it is usually a solitary specimen, and so mixed up or hidden, partly or wholly, by its common associates that a very keen eye and a persistent investigation of every clump are required to detect it. Superficially, therefore, the remark is justified, but let the expert take that district in hand for a day or so, and he will be unfortunate indeed if he does not return with a find or two, possibly rare or new, but in any case constituting an interesting souvenir of the locality. The "find," as we have said, may be anywhere, old walls, pollard trees, rocky chinks, stone dykes by the roadside, the sloping hedge banks of shady lanes, or the ferny recesses of woods and glens, all forms of habitat indeed may be teeming with normals from tiny seedlings or dwarfed adults to shoulder-high specimens forming a jungle. Thousands, or even tens of thousands of these come under the fern hunter's eye in the day's search, and then, perhaps, when almost despairing of a bag, a tiny tassel or the tip of an extra finely cut or otherwise varied frond is sighted, and lo! on extricating the fern from the crowd, all its fronds are seen to be so characterized, and a more or less valuable gem is unearthed to swell the hunter's collection. It is in this way that considerably over a thousand distinct varieties have been found and recorded, and it is in this way that that number is constantly being added to by those who make a hobby of fern hunting from the varietal side as distinct from those who raid the common ones by the basketful, and in many cases have thus destroyed Nature's raw material for long distances round popular and otherwise ferny resorts. We, ourselves, have been, more jocularly than seriously, accused of similar vandalism when, after a week or so's search, we have returned with a boxful of acquisitions, but there is a vital difference between the two classes of collection. Follow the ordinary raider, and we may often see the collected roots subsequently thrown away when by neglect they have wilted and lost their freshness, or if they reach home alive

they are dumped into the soil regardless of aspect, burning sun or windy conditions, so that if they do not perish by slow degrees, they can never develop the beauty they displayed in their normal habitat. In short, it is safe to say that the great bulk of ferns so removed are simply destroyed. Follow now the fern hunter proper. He finds a good variety, the roots of which after careful removal he wraps in wet moss, packing the fronds also carefully to prevent damage. Arrived home, if his find be a new one, his first care is to collect its spores and make a sowing, and the probability is that in a year or two he will have provided all his fern-loving friends with specimens for exchange or otherwise, thus multiplying and perpetuating instead of destroying. More than this, since the spores of good varieties are apt to yield not only the parental type, but also improvements in same, he may eventually be the proud owner of a new race or section of beautiful ferns which would never have seen the light had the original "find" been overlooked.

Recurring now to the "unique" character of the British Fern cult, it is truly unique in the sense that there is no other race of wild plants which is capable of providing all the material for splendid collections *exclusively from home material*. Take any other floral hobby we will, and when we inquire into the history of a collection, we shall inevitably find exotic or foreign influence to figure largely in it, both as regards origin of the plants concerned and also their raisers; but with a few exceptions, which can be counted on the fingers, consisting of varieties of such species as are indigenous in other countries as well as Britain and have been introduced by fern-loving travellers. the British Fern cult is a purely national one, devoted to native plants all found wild in our woods, lanes and glens in England, Scotland, Wales, Ireland and the Channel Islands, or derived from such wild parents by selection of their progeny. Another point in their favour is that being native plants, they are all hardy, with the exception of the maidenhair and the sea spleenwort, which are confined to

our warm western coasts or sheltered caves and cliffs. All the rest stand frost with impunity, and as they are lovers of shady conditions which are unfitted for healthy floral cultivation, they are particularly adapted for culture in thousands of conservatories whence sunshine is largely excluded by their position, while for shady rockeries in the open a good collection can be made of abounding interest. Finally, the British Fern cult or hobby possesses that great advantage over what we may term inorganic hobbies, such as bric-à-brac, postage stamps and curio collections generally, in that it deals with the inexhaustible wonders of Nature at first hand. The fern hunter in his quest traverses the most beautiful parts of the kingdom, pursues his rambles through them, enjoying fresh air and revelling in lovely prospects in the intervals when his intently roving eye can withdraw itself from the ferns which line the way, and which, to the experienced hunter, rivet his attention upon them by the recognised fact that at any moment a prize may turn up to reward his perseverance, and which, unlike the bric-à-brac or the postage stamp, may eventually be multiplied *ad infinitum* if he deems it precious enough to justify the trouble. C. T. D.

THE LIFE HISTORY OF A FERN.

As the thorough-going Fern student should know something more than the mere outward aspects of the Fern by which he is enabled to determine the species, it will not be out of place to give in as non-technical a way as possible, a short account of how ferns differ from flowering plants, and how, despite the absence of flowers and obvious seed, they manage to reproduce themselves. In the first place, then, Ferns belong to the spore producing tribes of plants as distinct from the seed-bearing or flowering ones, and since fertilization is an essential to constant reproduction and the persistence of a species while the spore differs from a seed in not being the outcome of such fertilization, it becomes necessary to know how and where this vital function is fulfilled. A seed, as we know, simply requires to be sown.

to produce directly a root and leaf system without any circumlocution whatever. The spore, on the other hand, when it is sown simply germinates and produces a little green heart-shaped scale (prothallus) closely attached to the soil by a multitude of tiny root-hairs, and from this in course of time a little fern rises, duly provided with root and frond and capable of independent existence. This, however, it has been shown, really springs from a properly fertilized seed, and although the process is effected on such a minute scale as to need a microscope to examine it, the fertilization of this seed is effected in practically the same way as that of the seed of a flower, the chief difference being that the seed is embedded in the substance of the scale, and germinates *in situ* instead of being detached and shed to germinate elsewhere. If we reverse one of the little scales aforesaid and examine it with a fairly good lens we shall find on its under surface, like so many tiny pimples scattered about among the root-hairs, a number of little round projections (antheridia) and close to the indentation of the heart on a sort of thickened cushion we shall see a small cluster of larger and longer hollow projections (archegonia). At the base of each of these, deeply embedded in the cushion aforesaid, is an embryo seed. At the proper time, when under moist conditions the underside of the scale is bathed in dewlike moisture, the little pimples burst and send out a cloud of very minute organisms termed antherozoids, which are provided with movable hairs or cilia, by means of which they swim actively about in the water and make their way towards the cluster of larger projections, traversing which they fertilize the seed at their base, precisely in the same way as pollen fertilizes the seed of flowering plants. This done, the seed perfects itself, and eventually breaking through the lower part of the cushion roots into the soil and sends up its first frond with a bud at its base, and in this way a second generation of Ferns is produced. From this it is seen that, after all, flowers are practically borne by Ferns, but on a microscopic scale. We may also gain a practical lesson from this, as it shews

how moist conditions are essential to successful spore propagation, especially at the critical period when fertilization should occur. This is the normal life cycle of all Ferns, but, thanks to careful study of the varietal forms, it has been found that Nature has not only endowed Ferns with a capacity to sport as far as outward appearance and structure go, but that every conceivable variation of this life cycle occurs. Normally, the succession is Fern, spore, antheridia, archegonia, embryo seed and Fern again; but it has been proved that reproduction can take place, leaving out every one of these stages either singly or even in the lump, including the apparent paradox, the very Fern itself. In the variant known as Apospory, the fern cuts out the spore by forming the green scale direct on its fronds, in that known as Apogamy the embryo seed and its adjuncts are omitted, the young fern appearing as a bud on the scale. In such ferns as are bulbiferous, bearing young plants on the fronds, the scale and all intermediate stages are, of course, left out, while the final apparent paradox is solved by the fact observed by Dr. Lang that the scale itself was capable of producing spores direct, and, of course, if these spores inherited that capacity, the Fern as we know it would be omitted altogether, and only generation after generation of the scale stage would exist. It will be seen from these data that the cross fertilization of Ferns cannot be conducted on the same sure and scientific lines as that of flowers. With flowers we can take precaution against self fertilization, and we can easily transfer what pollen we will from one flower to a different one and be fairly certain what pairs are united. With ferns, on the other hand, in which self fertilization must be the rule and crossing a rare accident, we cannot possibly either handle the pollen equivalents or be sure that fertilization has not already occurred. All we can do is to sow the two kinds of spores together somewhat closely, or bring pairs of young prothalli from different sowings into close juxtaposition before maturity, flooding them then from time to time on the chance that the roving antherozoids may thus be carried

from one prothallus to another and thus effect the desired object. That cross fertilization does occur is abundantly demonstrated by the existence of ferns in which two distinct parental characters are united. The charming lattice work and tassels of *A. f.f. Victorae* have thus, for instance, been allied with the bristly character of *A. f.f. setigerum*, and it is noteworthy that the spores of the joint offspring reproduce the joint type truly and freely.

C. T. D.

FERN HUNTING EPISODES.

Although Fern hunting expeditions hardly belong to the very risky or adventurous category, since the "quarry" however "wild" is never aggressive, it occasionally contrives its best to baffle acquisition, and doubtless every "hunter" could relate anecdotes connected with difficulties of this kind. Several years ago, while out hunting in the Barnstaple district, I came to a low parapeted stone bridge spanning a mill leat with a very rapid stream. About 7 or 8 feet down, near the crown of the arch, was a very pretty spiral Hartstongue growing in a chink in the masonry. I could just reach it with my stick, but if I dislodged it, it would inevitably fall into the water and be swept away, as the stream itself was not only swift but inaccessible. Happily, the day being dull, I had my umbrella with me and opening this I suspended it by a string below the arch and subsequently managed to tickle the fern out of its retreat with the extreme point of my trowel, until it fell into the "brolly" and was promptly bagged fairly intact.

A somewhat similar case recently confronted me in the Totnes district, but a far more baffling one. Here it was a clump of a very pretty *Polypodium vulgare* with regular roundly-lobed pinnæ, a form new to me. This was embedded in a chink so low down that I could only just reach it with the top of my walking stick. The river Dart ran below, but even had I an umbrella, which I had not, the above plan of suspension would not have fitted, since the fern was growing within a few inches of a buttress

projecting at right angles, which would have left a large gap between umbrella and wall, precisely beneath the fern. Here was a puzzle, but determined not to go away minus the fern, I cogitated for a while, and then being provided with a ball of string, an indispensable part of a fern-hunting outfit, I made a loose slip knot and coaxing this over the fronds with the tip of my stick I managed to draw it tight and lasso them. This done I lashed my open penknife (the trowel was unavailable) to the stick, and leaning over cut out a good piece of the embedded rhizome until the fern swung out loose at the end of the string, which was then drawn up and the prize bagged.

Last Christmas, near Torquay, I noted a very fine crested Hartstongue about 10 or 12 feet up a high wall, quite out of reach—another puzzle, a country road and not a soul in sight. Presently, however, when almost in despair, I espied a lad in the distance, and, managing to attract his attention, I hoisted him on to my shoulders and under my instructions he managed to dislodge enough of the caudex, despite its being tightly frozen in, for me to establish a plant with, now a pretty specimen. I may mention that in both these last cases, sufficient of the fern was left for it to re-establish itself, only part being taken. The acquisition of a fern, even when found under easily accessible conditions, is not always without difficulty.

Last year I found a full-size *Polystichum angulare*, near Seaton Junction, in a hedge bottom, and as it presented a very marked abnormal character, I determined to get it. To do so, however, I had to lie down and almost bury myself in the hedge, the caudex being far back and wedged so tight between the tree roots there that my trowel could do nothing, and my only way of acquiring was to pull it out by main force. Hence was presented the curious spectacle of an individual with his head and shoulders half-way through the hedge and his legs kicking wildly about outside it. Result, a gentleman came riding by on horseback, I heard him trot past and then stop and return, by which time I had wrenched my prize free and extricated my head suffi-

ciently to hear him ask whether I was hurt, since he had imagined that I must be struggling in mortal agony and had come back to see if he could assist me. Thanking him for his kindness and relieving his mind by an explanation, we bade each other good evening, he rode on and I proceeded to shoulder my booty and return to my temporary nest.

As a rule the acquisition of a new find consists merely in digging it up, extricating it from its common associates and packing it in paper, adding moss or grass, or something of that kind, damped if possible, to preserve its freshness, since I have great faith in preventing an acquisition from getting dry, so much vitality is lost if this precaution be neglected. It may, however, happen that the find is an old-established mass of so unwieldly a nature as to require assistance. A case of this kind stands out vividly in my memory as I write. One Sunday morning, leaving my fern trowel religiously behind me to secure me from temptation, I came to a brook on the edge of Dartmoor with sloping banks, dotted here and there with clumps of *Lastrea montana*, seen from an elevated path. Scanning these clumps, one of them, some 20 yards away at the edge of the brook strikes me as "funny-looking," something odd and unlike the rest. Walking rapidly down the slope closer investigation reveals that I have found a most beautifully tasselled and slender growing variety, a gem of the first water. (*L. montana cristato-gracile*, *Druery*.) The clump however, is about a yard through, a dense mass of many crowns, altogether unportable; what is to be done? Carefully noting the surroundings and putting a frond into my hat to show to my better half, staying in the adjacent village, I return, but can hardly persuade her that I have made such a discovery until later in the day we return to the spot and she finds it again in proof of my sincerity. The next morning I engage a man, with a stout fork, to assist me in lifting the plant, but neither he nor I can move it until a quarry cart and driver coming along, we enlist their services and eventually lift *en masse* $1\frac{1}{2}$ cwts. of fern

and soil and drive it triumphantly into the village, dumping the mass into a huge hamper secured for the purpose, in which it eventually reached London. Dissected, it proved to have no less than 33 crowns, a number of which were at once distributed far and wide among fern-loving friends. Finds of such magnitude and quality are rare indeed, but the chance of such discoveries always exists, especially in unfrequented districts. Perhaps the most portentous Fern-hunting episode in my memory is one which I escaped.

Hunting in the vicinity of Campsie, N.B., I found close to the railway a very distinct form of *Lastrea dilatata* (*L. d. stipitato laciniata*) about noon, and took the train from Campsie Station back to Strathblane between 12 and 1. About 2 a cloud-burst struck the very spot I had been hunting, and washed the line away for hundreds of yards, a fortunate escape indeed, and I was glad the "waterspout" had not "found" me.

C. T. D.

WILD SPORTS IN BRITISH FERNS.

(*Abstract of Lecture delivered to the Royal Horticultural Society.*)

If we study the literature of plant variation and especially the references thereto in technical botanical works, we cannot, in default of better knowledge, fail to derive the impression that what are termed "monstrosities" by some, and "distinct sports" by others are in some occult way due to cultural influences. The very term "garden varieties," so often used in this connection, permits of no other interpretation, especially when we consider that, until very recently, the plants to which botanists applied this term were, as a consequence, entirely excluded from purely botanical study. They were dubbed "monstrosities," and regarded in much the same way as most of us regard those terrible things which may be seen at the Museum of the College of Surgeons, and in similar collections. In the case of most plants the varieties which we see in cultivation and which form the bulk of our floral exhibitions, have

reached their present stage of development by long continued selection, generally by a considerable number of breeders and consequent accumulation on diverse lines of those small individual differences which characterize seedlings. These differences being transmitted by inheritance, and occasionally enhanced by what may be termed minor sports, amounting eventually to such a transformation that no outsider would impute them to their original parents. As this accumulation of character occurs entirely under culture, we may justifiably term the plants so obtained "garden varieties." We may equally justly apply the term to another large section of floricultural exhibits obtained by hybridization, since in both cases the types are due to human agency, controlling in certain directions the innate tendency to variation in the one case and the power of combination in the other case, while protecting the resulting plants from that purely natural selection which would probably result in the destruction of most of them. As a consequence of so much divergence of type being brought about by these selective and combining operations in cultivators' hands, the opinion has gradually been strengthened that it is culture which is the cause of the variability displayed, more especially as the behaviour of purely wild plants under purely natural conditions is comparatively little studied and practically (with one exception) not at all by cultivators for the market so as to admit of a proper comparison of the two plant sections, viz. the wild and the cultivated, as regards their relative variability. The one exception exists in the case of our native wild Ferns, which have now been my special study for over a quarter of a century, and which represent absolutely the only group of genera and species which, in their purely wild state, have been subjected to singularly close scrutiny by a considerable number of skilled observers for over half a century. These observers have devoted their attention to the discovery among wild plants of "sports," or markedly distinct abnormal forms, and, thanks to a few of the most prominent ones, a constant record has been kept of their

finds and those of others, and although this record also embraces a number of varieties subsequently improved in type by selection of the progeny of the wild finds, those raised are always so described, and cannot be confused with the wild finds themselves. Moreover, and this as another material point, the plants have invariably been collected as living plants, and not merely as herbarium material, and having been carefully preserved and multiplied by off-sets and bulbils, the bulk of them are still existent in British Fern collections. It is also worthy of note that although all our native species, without exception, are also indigenous to other temperate countries, and some of them almost ubiquitous, this particular study has almost exclusively been confined to the British Isles, and the specimens extant are, therefore, with but a few exceptions, truly British wild plants. We have, therefore, an immense mass of purely unsophisticated material to deal with in considering the comparative variability of this section of plant life under wild and cultural conditions, while the records are incontestible as regards their wild origin, and in this particular connection are of the greater value, as they were not compiled with any view to establish a theory of variation, and are, therefore, quite unbiassed. The latest and most complete record of this kind is found in the late Mr. E. J. Lowes' "British Ferns," 1891, published by Swan, Sonnenschein & Co. This is a descriptive list, giving the date and locality of the discoveries, and the names of the finders, together with enhanced types raised by selection, these being marked "raised," with the raiser's name. It is noteworthy that these latter are, in every case, of similar type to the wild parent, though this may be as it were emphasized, *i.e.* more marked. For a really new type we have invariably to look to the wild fern. This fact, ripely considered, goes far to prove greater variability under wild conditions than under culture, instead of the generally accepted converse case. We may now come to the consideration of how far this fifty year record demonstrates the proportion of wild sports to those which may be

regarded as "garden varieties" proper, and on analysis of the list we find that no less than 1,360, out of a total list of 1,717, originated in a wild state, *i.e.* 1,360 as against 357. In this connection it may be argued that a far greater number of variations may have occurred under culture, but that owing to their inferiority they have not been recorded. This is perfectly true, but is fully counter-balanced by the fact that the record of wild sports is subject to the same observation, since it only embraces what the fern hunter considers to be acquisitions, and ignores a vast number of inferior and defective "sports," which, from the biological point of view, are fully as interesting as the others, and equally affect the question of comparative variability. I have heard it mooted that the immense number of "sports" found in the British Isles, as compared with other parts of world where ferns are plentiful, may be partly due to escaped spores from the various collections scattered about the country, but this idea, for several reasons, cannot be substantiated. Wild sports, as a rule, have an independent individual character of their own, and it is comparatively seldom that more than one of precisely the same type has been separately found, while escaped seedlings are easily recognized as such by the experts. For instance, in a wood near Levens, in the Lake District, the gardener at Levens Hall, Mr. Craig, who was also a fern collector, scattered a great number of spores from abnormal ferns in his collection. Even to the present day, examples crop up in that wood. A few years back I went through it myself and found several, but in every case I could at once name the parent, and even had I not known the fact of the sowing, I should have suspected it from the identity of the types with those I am acquainted with. On the other hand, I have hunted many localities, and found a good many varieties under conditions where strays were practically impossible, on hillsides and in glens, and by the roadsides, and on the moors, Dartmoor and Exmoor, far remote from any known collections, and in no case

has there been a family likeness to previous finds as in the case above cited. I doubt, furthermore, very much if fern spores travel very far from their place of origin, except perhaps by water agency. The spores, small though they be, are dense and heavy, and though countless millions may be annually shed, very few indeed reach the stage of fern production, while many varieties, though fertile and constant in their progeny, certainly are not so robust as the normals, and would consequently be greatly handicapped as strays in their infant stages. This is furthermore evidenced by rarity of varietal colonies, the finds being generally solitary. For these reasons, therefore, I cannot accept the theory aforesaid, that the number of wild sports has been augmented by "escapes." All experienced fern hunters seek the most remote localities, and it is mainly in such that the "sports" recorded have been discovered. This fact also disposes of the idea that artificial conditions of any kind contribute to variability, or that change of environment underlies it. Many of the most marked forms have originated under conditions which must have been identical for centuries and tens of centuries. They are, moreover, when found, so closely associated or even intermingled with the abundant normals that their actual environment, ærial and terrestrial, is identical, so that it is impossible to conceive a reason why Nature should have, at one stroke, endowed them with such different styles of structure or even different reproductive characters, as in the aposporous ferns, plus the capacity of reproducing themselves as truly and constantly as any species does.

PERSONAL FERN FINDS.

As, apart from the supreme incentive, viz. actual finds of good varieties by himself or herself,* nothing tends more

* As many good fern finds have been discovered by ladies, for whom the cult is peculiarly fitted, we should like to impress upon them the fact that when we speak generally of hunters, finders, or raisers, or write "he" or "him," as the case may be in the general sense, the fair sex is always by implication included.

to encourage the budding fern student and fern hunter or hunters than a definite knowledge of what has been effected in the way of successful hunting. We propose in this and subsequent issues of the "British Fern Gazette" to give lists of recognized "sports," together with any interesting data relating to their discovery, such lists being compiled by the discoverers themselves. The editor would therefore be glad to receive such data, but would ask his correspondents to confine their records for publication to really distinct and constant forms, ignoring such as are merely curious and irregular, and therefore outside the scope of those eligible varieties to which, in these days of abundant good material, it is desirable to confine attention. Such lists may also naturally embrace improved forms raised from spores, and if such can be accompanied by good photographs so much the better. As far as possible the parent should be specified, or both parents if cross fertilization has been successfully achieved. By way of a start I (in this case I am forced to use the first person singular) give the following list of my own finds with localities, appending thereto a few notes regarding special varieties which I have raised, since these figure both largely and strikingly in my collection.

ORIGINAL FINDS.

ATHYRIUM FILIX FEMINA.

- A. f.f. *revolvens*. Strathblane. Fronds rolled nearly into tubes.
- A. f.f. *cristatum Kilrushense*. Kilrush. Fine pendulous tassels; by far the best wild *cristatum* found.
- A. f.f. *oreopteroides*. Devon. Fronds resemble *L. montana*.
- A. f.f. *Camserniense*. Camsernie. Fronds resemble *L. montana*, pinnæ *imbricate*.
- A. f.f. *medio deficiens*. Innerwell, N.B. Centre of frond and pinnæ open.
- A. f.f. *medio deficiens*. Strathblane. Centre of frond open.

- A. f.f. *medio deficiens*. Kendal. Centre of frond open.
 A. f.f. *deltoideum*. Strathblane. Basal pinnæ wide, fronds
 revolved.
 A. f.f. *cruciatum*. Loxhore. Apex of frond and pinnæ
cruciate.

SCOLOPENDRIUM VULGARE.

- S. v. *spirale*. Clovelly. Small; very leathery fronds.
 S. v. *spirale*. Ottery St. Mary. Thinner in texture.
 S. v. *spirale*. Chelfham. Robuster than Clovelly find,
 very thick.
 S. v. *transverso lobatum*. Sidford. Roadside.
 S. v. *transverso lobatum*. Colyton. Bank of brook in a
 tree root.
 S. v. *ramo cristatum*. Guernsey. *Ramo cristate* form;
 wall of bridge over stream.
 S. v. *corymbiferum*. Sidmouth. Fine bunch-crested
 form, in hedge.
 S. v. *angustato lobatum*. Near Clieveden. Very long,
 narrow fronds, digitate ends.
 S. v. *marginatum*. Several places.
 S. v. *sublineatum*. Penrhyn. Thick leathery fronds,
 curved tips, row of serrate points beneath, both sides
 midrib.
 S. v. *fissum*. Camelford. On wall; very neat, fronds
 thick.
 S. v. *serratum*. Falmouth. Pretty *marginate* form; retain-
 ing wall of garden in street, small leathery fronds.
 S. v. *cristatum*. Penrhyn. Fan-like crest.
 S. v. *cristatum*. Penrhyn. Bunch crest; churchyard
 wall.
 S. v. *angustatum*. Penrhyn. Developed flat crests under
 culture. (?) if constant. Churchyard. Not crested
 when found, only narrow.
 S. v. *ramoso-cristatum* Druery. Penrhyn. Developed
 very finely, fronds branch into distinctly stalked ones,
 each neatly crested. One tiny frond in hedge bank.
 S. v. *ramosum*. Babbacombe. Cottage garden wall.

- S. v. folioso cristatum.* Babbacombe. Wall in street byeway. (?) A grandiceps, veins much netted.
- S. v. ramo multifidum.* Babbacombe. On high wall, fronds resembling stag horns, but under culture more foliose, very good. Proliferous.
- S. v. ramosum.* Babbacombe. Found as tiny seedling, two fronds broadly twinned, subsequent fronds ramosae
- S. v. muricatum.* Colyton. Surface well muricated up centre
- S. v. variegatum.* Colyton. Light green, streaked with darker stripes.
- S. v. variegatum.* Staverton. Rich orange-yellow fronds, some mottled green and yellow.
- S. v. latum.* Colyton. Very wide, $4\frac{1}{2}$ inches, found alongside normal in hedge bank.
- S. v. subcontractum.* Colyton. Cordate base usually contracted.
- S. v. contractum.* Colyton. Base narrowed for some distance up.
- S. v. gymnosorum.* Kilrush. Narrow form, spores without indusium, irregularly scattered on surface.
- S. v. ramo cristatum.* Staverton, 1909. Fronds branched and crested, here and there marginate.

LASTREA DILATATA.

- L. d. stipitato-laciniata.* Campsie. Pinnæ and pinnules long stalked and laciniated.
- L. d. cristata.* Clovelly. All terminals crested.

LASTREA FILIX MAS.

- L. f. m. mediodeficiens.* Aberfeldy. Centre of frond open.
- L. f. m. cristata.* Kilrush. Crested, defective *à la Jervisii*.
- L. f. m. polydactyla Grougarensis.* Grougar, N.B. Well tasselled.

LASTREA PSEUDO MAS.

- L. p. m. gracile.* Loxhore. Slender form.

LASTREA MONTANA.

- L. m. cristato-gracile*. Sticklepath. Slender fronds and crests.
L. m. congesta. Aberfeldy. Congested.
L. m. truncata. Several places. All tips squared and thorned.
L. m. plumosa. Kendal. Good plumose form.

POLYSTICHUM ANGULARE

- P. ang. revolvens*. Colyton. Very good tubular form.
P. ang. cristulum. Colyton. Very minute crests at points of frond and pinnæ.
P. ang. caudatum. Minehead. Upper half of frond much narrowed.

POLYPODIUM VULGARE.

- P. v. macrosorum*. Minehead. Wide sub-bipinnate fronds, *sori* very large and abundant.
P. v. longipinnatum. Killarney. Very long attenuate pinnæ
P. v. bipinnatum. Chepstow. Bipinnate.
P. v. bifido foliosum. Colyton. Bi and trifid and foliose.
P. v. crenatum. Milnthorpe. Crenate.
P. v. obtuso crenatim. Staverton, 1909. Round lobed pinnæ, here and there truncate and thorned.
P. v. bifido deltoideum. Devon. Basal lobes bifid and very large.
P. v. sub-cambricum. (?). Glastonbury. Foliose form, bipinnate.
P. v. adpresso-bifidum. Colyton. Bifid and pinnæ turned inwards towards midrib.

ASPLENIUM.

- Asp. trichomanes cristatum*. Holne. Fronds crested.
Asp. trichomanes cristatum. Loxhore. Fronds crested.
Asp. adiantum nigrum lineare. Penrhyn. Fronds very slender and long.
Asp. adiantum nigrum caudifolium Dartmoor. Dwarf flat-growing form, with linear pinnæ yellow lobed.

BLECHNUM SPICANT.

- B. s. concinnum** Druery. Exmoor. Fronds narrow and of uniform width, lobes like small scallop shells, unique.
- B. s. subconfluens.** Several places. Pinnæ confluent near frond tips.
- B. s. polydactylum.** Wooda Bay. Fronds divided at tips.
- B. s. polydactylum.** Colyton. Fronds divided at tips.
- B. s. strictum.** Camelford. Pinnæ serrate, good form.
- B. s. strictum.** Dartmoor. Pinnæ serrate, good form.
- B. s. contractum.** Dartmoor. Lower pinnæ short and serrate.
- B. s. rotundatum.** Aberfeldy. Fronds narrow, almost linear, with pinnæ as round lobes.

SPECIALITIES RAISED.

- A. f.f. plumosum superbum** Druery. Raised from spores of *A. f.f. plumosum elegans* Parsons, raised from *Axminster plumosum*, wild find, fronds very plumose and finely crested, although parent quite devoid of crest.
- A. f.f. plumosum** Druery. Raised from *A. f.f.p. superbum* Druery, a magnificent form; nothing to compare to it.
- A. f.f. plumosum superbum }
percristatum Druery. } i.e. from same batch of**
- A. f.f. kalon - - - - - } spores; all crested to third**
- A. f.f. grandiceps - - - - - } or fourth degree.**
- A. f.f. dissectum - - - - - }**
- A. f.f. foliosum - - - - - } Same batch, but uncrested.**
- A. f.f. plumosissimum - - - - - }**

There are some half-dozen others of equal merit but unnamed, the whole batch being most remarkable and forming an easily recognizable section even in their offspring, of which a great number have been raised from spores and bulbils which some of them produce on the frond backs in conjunction with the spores. This is inherited from the Axminster progenitor.

Polystichum aculeatum pulcherrimum Druery.

” ” gracillimum.

The above, with a number of others, represents a most remarkable new section of Shield Ferns raised jointly by Mr. C. B. Green, of Acton, and myself. In some of these the sub-divisions of the frond, only $\frac{1}{2}$ inch long in the parents, are as much as 3 inches in length, with splayed tassel-like terminals. No two are precisely alike, and one of Mr. Green's batch resembles the *densum* section of *P. angulare*, being tripinnate and dense. The parent, *P. acul. pulcherrimum*, was found nearly 40 years ago in Dorset, and has reputedly borne no spores until a few were found from which this wonderful batch arose in conjunction with a number of the parental type and a few reversions strongly resembling *P. angulare*.

SCOL V. SAGITTATO GRANDICEPS.

This fern is a very curious one. Its parent was a wild find by Mr. J. Williams, St. Austell, who sent me for inspection a frond taken from the plant when found. It was merely a normal, with divided frond tips of the lobatum type, plus an arrow-shaped base with fanned tips. The spores sown from this, however, yielded, amid a batch of more or less common ones or of the parental type, nine plants, in which the whole of the blade of the frond was suppressed, while the divided tips of the basal lobes and the frond tips were transformed into 3 dense bunches close set together, forming as a rule a triple bunch surmounting a bare stalk. The fronds are also sparsely viviparous, bulbils appearing on the surface. It will be noted that these originated from wild spores and not after cultivation; a peculiar instance of how great a varietal jump may occur under purely natural conditions in the potencies of the spores.

A. F.F. KALOTHRIX CRISTATUM.

This is a well crested form of the beautiful *A. f.f. Kalothrix*, which appeared spontaneously in a sowing of my own "superbum" section, no less than 7 plants originating from one prothallus. So far it has remained very dwarf, persisting in forming little tufts by lateral off-sets instead of a larger single crown.

C. T. D.

== FERNS. ==



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LASTREA MONTANA PLUMOSA. STANSFIELD (see page 26).

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EDITORIAL NOTE.

The Editor is happy in this number to be able to include contributions from other fern lovers and students, and to be thus relieved from a too prominent position in the pages of the "Gazette," unavoidable in the primary issue, as the "Gazette" is intended to be the medium of communication between all lovers of British ferns. He cordially invites contributions of any notes of mutual interest or enquiries in that connection. An exchange column has been suggested, and the necessary material being sent in by members, its gratis insertion will form one. It is to be hoped that the members will do their best to increase the membership of the Society, already largely augmented by the issue of the "Gazette." It may be well to mention that a supply of the "Gazette" will be reserved for the benefit of such members as may join subsequent to publication, so that their subscription of five shillings (payable either to Mr. Whitwell, the Secretary, or to the Editor), covering the year between August, 1909, and

August, 1910, will entitle them to all four of the quarterly issues.

A copy of the "Gazette" will be willingly sent to any one likely to become a member. All communications, MSS., etc., concerning the "Gazette" should be addressed direct to the Editor, 11, Shaa Road, Acton, London, W.

EDITOR.

OUR FRONTISPIECE.

This represents a very beautiful plumose form of *Lastrea montana*, respecting which the finder, Dr. F. W. Stansfield, furnishes the following note:—

On July 27th, 1908, I found near Nevin, Carnarvonshire, a first-rate plumose *Lastrea montana*, which appears to be quite distinct from other plumose forms of this species. It is perfectly symmetrical and thoroughbred in character, and, although perhaps less finely dissected than Mr. Whitwell's find, is probably more foliose than any other plumose form yet known. The pinnules are deeply incised, but the lobes are broad and rounded, which causes them to overlap each other very much, and are, moreover, curved forward and undulated at their margins, so as to produce a very charming, crispy effect in the fresh frond, which is quite lost in a pressed one. The plant is, so far, quite barren, and has only a single crown, so that it will be some time before it can be propagated to any extent. It has not yet attained full development, and will probably show yet finer character when mature.

F. W. STANSFIELD.

Reading, Nov. 5th, 1909.

SPORE PROPAGATION.

Naturally, the first desire of a successful fern hunter is not merely to secure the individual existence of his find, but to multiply it, and, if possible, improve its particular character by virtue of that general tendency to vary in the offspring, which is inherent in all abnormal sports. Although thoroughbred types breed true as a rule, their

offspring displaying the same characters as their parents, it frequently happens that examples present themselves in which these characters are emphasized, as it were, constituting in many cases great improvement and enhancement of their beauty. Thus normally pinnate ferns, divided but once, like *Blechnum spicant*, having sported naturally into deeply serrate forms, the offspring of these have gone farther, and, by exaggerating the serration, yielded through their spores bipinnate or even nearly tripinnate varieties, and this may be taken as an example of possible variation with bipinnate normal forms, which may yield from somewhat more divided sports, tripinnate or even quadripinnate progeny of great beauty. This has happened with *Polystichum angulare*, in the case of the lovely Jones and Fox section of *divisilobe plumosums*, of which a batch arose in a sowing of merely "decompositum" spores.

Now, inasmuch as propagation by bulbils or offsets very rarely results in anything but multiplication of the parental form on exact lines, it is clear that if we want to improve, we must have recourse to the spore. In this connection, perfectly barren ferns are very few compared with fertile ones, and although spore production certainly diminishes as frond dissection increases, and thus in the most plumose forms is reduced to a minimum, as a rule careful inspection reveals that spores occur here and there, even perhaps as minute clusters of two or three *sporangia*, or spore pods, which the naked eye can hardly detect. A single pod, however, is capable of yielding some thirty or forty plants, so that even an all but sterile fern produces quite enough progeny for any amateur to deal with. In such cases our own plan is to carefully cut off the pinnules bearing such pods, and lay them back downwards on a glass slip, such as is used for microscopic objects. Placing this a few hours later under the microscope, the pods will be found to have burst, and the spores will be scattered over the glass in their vicinity. By doing this, the confidence is acquired that the variety is really sown, and that with proper care a crop may be expected.

A few ferns are really barren, though producing apparent spores in abundance, *Asp. trichomanes confluens* to wit, and the futility of sowing is seen at once on the microscopic field, the assumed spores being seen as mere brown snuffy dust and not as the regular little egg-shaped bodies which perfect spores display. With thoroughly fertile ferns the spores are so abundant that it is advisable to treat as above but a very minute portion of a frond so that this abundance may be fairly grasped, and also the absurdity of sowing a score of thousands in a pot or pan scarcely capable of accommodating as many hundreds.

It is a common practice to lay down an entire frond on smooth paper, upon which the spores are shed in a few hours so thickly as to produce a sort of brown replica of the frond itself, such replica consisting of millions of spores, and this, in the amateur's hands, constitutes a temptation to sow too thickly, often with failure as a result, very thin sowing alone giving the infant ferns a fair chance.

With these warnings we may now describe the actual sowing. In order that the spores may not be upset by intrusive worms or handicapped by spores of mosses and confervæ we fill a well-drained pot or pan with good fern compost of loam leaf-mould and sand (2, 2 and 1), and, topping this with a few crumbs of the loam, we scald it thoroughly with boiling water. Letting it cool, the spores are scattered thinly and evenly over the surface. The pot is then covered with a glass slip and put away in a cool well-lighted Wardian case or greenhouse, out of direct sunshine, and left severely alone. To prevent drying out, it may stand in a saucer in which a little water may be kept. Since a very small thimble or thumb-pot suffices for a fair number of plants, a capital plan, where several sowings are concerned, is to fill a square pan with cocoanut fibre and pack the little pots, after sowing, in this, covering the lot with one pane of glass. In this way the risk of drying out is minimized, since it is only necessary to keep the fibre moist. No water must be given overhead until the soil is covered with the green growth produced from the spores.

When these are full size, about as large as herring scales, tepid water overhead may help fertilization. Each sowing should be numbered and registered in a book kept for that purpose. Cross fertilization may possibly be effected by sowing two varieties together on the off-chance, but self-fertilization is the rule.

PERSONAL FINDS

BY

MR. G. WHITWELL,

SECRETARY OF THE BRITISH PTERIDOLOGICAL SOCIETY.

Mr. George Whitwell, for many years Secretary to our Society, has been an assiduous Fern hunter in the Lake District for about forty years, and has very kindly provided the following list of his discoveries, with, in many cases, indications of aspect, soil, and other data of interest both to the fern hunter and cultivator.

LASTREA MONTANA.

NAME.	WHERE FOUND.	ASPECT.
<i>angustifrons</i> ...	... Patterdale ...	... North
REMARKS.—Fronds erect and very narrow, gravelly soil, low down on the hill side, whinstone rock, not many normals; there would be about forty or fifty crowns altogether.		
<i>angustata</i> ...	... Langdale ...	... N.E.
REMARKS.—Very narrow and erect, gravelly soil, a good height up on the hill side, whinstone rock, two crowns, plenty of normals.		
<i>breviloba</i> ...	... Kentmere ...	... N.E.
REMARKS.—Pinnules evenly reduced, strong loam, whinstone rock, not many plants, a good many normals.		
<i>cristata</i> ...	... Frostrow ...	... N.E.
REMARKS.—Pinnæ and fronds crested, strong loam, whinstone rock, low down on the hill side; there would be over 100 plants scattered about amongst normals, species not so plentiful.		
<i>curvata</i> ...	... Garsdale ...	... N.E.
REMARKS.—Pinnæ curved downwards, dry stony hillside, whinstone rock. When I found my first plants in 1883 there were a good many plants amongst normals; species fairly plentiful. I have also found other two good forms, one which I consider the best of the type. Also found in Eskdale and Rydale.		

NAME.	WHERE FOUND.	ASPECT.
<i>crispata</i>	Garsdale ...	N.E.
REMARKS.—Fronds crispate, pinnæ undulated and crispy, strong loam, whinstone rock, low down the hill side, one plant with five or six crowns, species plentiful.		
<i>caudata</i>	Kentmere ...	N.E.
REMARKS.—Fronds and pinnæ very caudate, strong loam, whinstone rock, steep hillside, only a few plants, all growing together, species plentiful.		
<i>crispa</i>	Kentmere ...	...
<i>congesta</i>	Dent ...	N.E.
REMARKS.—Frond and pinnæ congested, strong loam, whinstone rock, high on the hillside, two crowns, not many normals.		
<i>deficiens</i> Whitwell	... Longsleddale	... N.E.
REMARKS.—Fronds defective, a strange-looking plant, stony soil, whinstone rock, high on the hillside, about 20 plants altogether, not many of the species.		
<i>furcillata</i>	Brotherswater	... N.E.
REMARKS.—Fronds and pinnæ furcillate, strong loam, whinstone rock, only a few crowns amongst normals, species plentiful.		
<i>inæqualis acutiloba</i>	Cautley ...	... N.E.
REMARKS.—Pinnæ uneven, acute, strong loam, whinstone rock, only three or four crowns all together, species fairly plentiful in the valley.		
<i>inæqualis confluens</i>	... Cautley ...	... N.W.
REMARKS.—Pinnules unequal and confluent, gravelly soil, whinstone rock, high on the hillside, only one plant, species plentiful.		
<i>inæqualis extensa</i>	... Hartsop ...	... N.E.
REMARKS.—Pinnules very much reduced, strong loam, whinstone rock, high on the hillside, only a few crowns mixed with normals.		
<i>interrupta</i>	Brotherswater	... N.W.
REMARKS.—Pinnules much reduced, strong loam, whinstone rock, high on the hillside, a good many plants all together, species not so plentiful about.		
<i>interrupta rugosa</i>	... Coniston ...	... N.E.
REMARKS.—Frond interrupted and rugose, strong loam, whinstone rock, only two plants, a fair amount of normals, low down on the hillside.		

- | NAME. | WHERE FOUND. | ASPECT. |
|--|---|-------------|
| latifolia | Cautley | N.E. |
| REMARKS.—Pinnules broad, overlapping, strong loam, whinstone rock, only a few plants, low down in the valley, not many of the species. | | |
| multiformis | Garsdale | N.E. |
| REMARKS.—Fronds many forms, strong grower, strong loam, whinstone rock, low down in the valley, only one plant, amongst plenty of normals. | | |
| multifurcata | Coniston | N.E. |
| REMARKS.—Pinnæ many times forked, frond not forked, strong loam, whinstone rock, only a few plants scattered about amongst normals. | | |
| præmorsa | Potterfell | S.E. |
| REMARKS.—Pinnæ marginate, strong loam, whinstone rock, not so many plants, about 20 or 30 scattered about amongst normals. | | |
| pterophora | Little Langdale | N.E. |
| REMARKS.—Fronds erect and rather narrow, pinnules crowded, strong loam, whinstone rock, only two plants amongst normals, species plentiful. | | |
| Var. plumosa | Whitwell ... Potterfell ... | S.E. |
| REMARKS.—Fronds finely cut, foliose, barren, best of the plumose forms, strong loam, whinstone rock, high on the hillside; there would be some 30 or 40 crowns all together, some of them with fronds not more than six or seven inches long, showing good character; species plentiful. | | |
| stricta, Whitwell | Cautley | N.E. |
| REMARKS.—Fronds erect, very narrow, gravelly soil, whinstone rock, mixed with normals, some 50 or 60 crowns all together, growing on the high roadside, not many of the species. | | |
| serrulata, Whitwell | Garsdale | N.W. |
| REMARKS.—Pinnules unevenly reduced, distinct; growing just on the division of the limestone and whinstone rock, gravelly soil, one plant with four or five crowns, not many normals, low down in the valley. | | |
| serrulata | Troutbeck | N.E. |
| REMARKS.—Pinnules serrated, not so distinct as the above; I only saw one plant; species plentiful. | | |
| serrata crispa | Kentmere | N.E. |
| REMARKS.—Pinnules evenly reduced, serrated and crispy, strong loam, whinstone rock, high on the hillside, one plant with four or five crowns, not many normals. | | |

ATHYRIUM FILIX-FÆMINA.

NAME.	WHERE FOUND.	ASPECT.
apiculatum ...	Potterfell ...	S.W.
REMARKS.—Pinnæ narrow and caudate, yellow loam, whinstone rock, growing on the roadside, only a few plants, not many of the species.		
inæquale extensum ...	Garsdale ...	N.E.
REMARKS.—Pinnæ irregular, strong loam, whinstone rock, high on the hillside, not many plants about.		
inæquale pinnulum ...	Coniston ...	S.E.
REMARKS.—Pinnules as if eaten away, narrow fronded, gravelly soil, whinstone rock, only one plant, species plentiful.		
medio-deficiens ...	Crook ...	N.W.
REMARKS.—Basal pinnules wanting, whinstone rock, four or five crowns all together, growing on the roadside.		
Also found in Kentmere.		
pterophorum ...	Crook ...	S.E.
REMARKS.—Pinnules crowded, whinstone rock, yellow loam, three or four crowns all together on the roadside.		
congestum, Whitwell ...	Kentmere ...	S.W.
REMARKS.—Pinnules thick, dense, and crispy; good form, gravelly soil, on a bank by the river, four crowns all together, species plentiful.		
congestum crispum ...	Wastdale ...	...

BLECHNUM SPICANT.

condensum ...	Garsdale ...	N.W.
REMARKS.—Fronds congested, etc., sandstone rock, strong loam, only one plant, species plentiful.		
caudatum ...	Borrackfold ...	N.W.
REMARKS.—Apex of fronds attenuated, yellow loam, whinstone rock, about 20 plants all together.		
imbricatum ...	Potterfell ...	S.E.
REMARKS.—Segments overlapping, gravelly soil, whinstone rock, one plant, species plentiful.		
paradoxum ...	Banisdale ...	N.E.
REMARKS.—Three rows of pinnæ, one plant growing in the crevice of whinstone rock, species plentiful.		
projectum ...	Potterfell ...	S.E.
REMARKS.—Pinnæ irregular, gravelly soil, whinstone rock, four crowns all together, species plentiful.		

NAME.	WHERE FOUND.			ASPECT.
polydactylum	Potterfell	... S.E.
REMARKS.—This variety and <i>Strictum</i> I found in the same place as the above.				
strictum Whitwell	...	Dent	...	... S.E.
REMARKS.—Fronds narrow and divided, yellow loam, whinstone rock, one plant growing in the midst of a tuft of normals. Also found in Eskdale.				
strictum serratum	...	Eskdale	...	...
sub-serratum	...	Burneside	...	... S.E.
REMARKS.—Posterior margin crenate, gravelly soil, whinstone rock, one plant amongst normals.				
serrulatum Whitwell	...	Lambrigg	...	... N.W.
REMARKS.—Texture thin, serrulate, strong loam, whinstone rock; a small seedling when I found it growing amongst some more seedlings; species plentiful.				
super-bellum	...	Near Kendal	...	... S.W.
REMARKS.—Texture thin and fine, strong loam, whinstone rock, one small plant growing in the centre of a tuft of normals, not many of the species.				
stricto-projectum	...	Dent	...	... S.E.
REMARKS.—Pinnæ irregular, stony soil, whinstone rock, one plant amongst many normals.				
trinervium	...	Dent	...	... S.E.
REMARKS.—Basal pinnæ very large, stony soil, whinstone rock, one plant, not many of the species.				

LASTREA FILIX-MAS.*

cristata	...	...	Kendal Fell	... S.W.
REMARKS.—Growing in the face of the limestone rock.				
grandiceps...	...	...	Near Kendal	
polydactyla	...	...	Longsleddale	

LASTREA PSEUDO-MAS.

cristata	...	...	Great Langdale	... N.E.
REMARKS.—Golden-coloured pinnæ, crested pendulous, yellow loam, whinstone rock, four or five crowns all together, species plentiful. Also found in Langdale and Longsleddale.				

* Mr. Whitwell has recently sent us fronds of very fine crested forms of *L. f. m. linearis*, raised by him. They range from prettily tasselled types to fine *grandiceps*.—ED.

VARIOUS.

- | NAME. | WHERE FOUND. | ASPECT. |
|--|-----------------------------|-------------|
| Scol. vulgare Whitwellii ... | Serpentine Walks ... | S.E. |
| REMARKS.—Strongly ramo-cristate, limestone rock, one small plant, very few normals. | | |
| Scol. v. bimarginatum ... | Scout Scar ... | S.W. |
| REMARKS.—Fronds narrow, one small seedling, not many normals. | | |
| Scol. v. multifidum ... | Ribble Head ... | S.W. |
| REMARKS.—Crested, one small plant, limestone rock, species plentiful. | | |
| Scol. v. undulatum ... | Beetham ... | S.W. |
| REMARKS.—Fronds frilled, limestone, one plant, species plentiful. | | |
| Lastrea dilatata crispa | | |
| Polypodium vulgare ramosum ... | Near Kendal ... | N.E. |
| REMARKS.—Fronds divided at the base of the fronds, one small seedling growing on an old thorn bush. | | |
| Polypodium Phegopteris interruptum | Langdale ... | S.E. |
| REMARKS.—Fronds defective, yellow soil, whinstone rock, a patch about one yard square, the species not so plentiful. | | |
| Cystopteris fragilis interrupta ... | Kendal Fell ... | N.E. |
| REMARKS.—Strong loam, limestone rock, one plant, species not so plentiful. | | |
| Asplenium Ruta-muraria cristata ... | Kendal Fell ... | S.E. |
| REMARKS.—Limestone rock, one plant, species plentiful. | | |
| Asplenium Ruta-muraria dissecta ... | Kendal Fell ... | S.E. |
| REMARKS.—One plant on the limestone. | | |
| Hymenophyllum unilaterale cristatum | Langdale | N. |
| REMARKS.—A very fine patch of it. | | |

GEORGE WHITWELL, M.B.P.S.

POLYPODIUM VULGARE.

(The Common Polypody.)

In many parts of the country, from Land's End to John o' Groats, the common Polypody may be seen peeping out in the hedgerows and hedgebanks, from the crevices and summits of old walls, in the forks and gnarled bark

crevices of old trees, and among the rocky *debris* of secluded glens. In exposed situations it holds its own with short stunted fronds of an inch or two in length, and in congenial shade and moist situations we have found it with fronds nearer two feet, hanging in pendulous bunches. Normally, its fronds are long and narrow, consisting first of a somewhat long bare stalk, which, continuing through the frond, bears a row on each side of long smooth-edged, tongue-shaped side divisions tapering to a bluntish point. At the back of these fronds, if fertile, we may find each side division to bear two rows of bright golden spore heaps, looking under a lens like symmetrical heaps of ripe oranges, the seeming oranges being capsules full of golden spores, a beautiful sight to see. Occasionally, especially in Wales, we may find the side divisions saw-toothed and pointed, and even more or less subdivided, and in some localities the tips of the side divisions are often divided into two or three (*P. v. bifidum*), though rarely all of them. Examining the plant more narrowly we shall find that the fronds rise singly from a thick fleshy creeping rootstock covered with brownish scales, something on the lines of the Haresfoot fern (*Davallia Canariensis*), this being firmly anchored into the crevices or soil by a number of roots proper.

No one, to see this simply constructed fern, could imagine into what wonderful forms it has sported and what splendid evergreen ornamental plants they constitute. In our own Fernery we have the cream of these, numbering about forty distinct types, all but one of which was found as a wild plant, some in old pollard trees, some in walls, some in hedges, and some in rocky crevices. Let us walk round and take them as they come. Here is a beautiful group in a hanging basket, one of the best ways to grow the plant. It is a basin-shaped galvanized wire one, about 15 inches in diameter and 8 inches deep, suspended by four strong wires from a hook in one of the roof supports, for it is very heavy. This was lined with living moss to retain the soil and was filled up with a

compost of loam and brown peat, half and half, with a liberal dash of coarse silver sand. In this we have six fine varieties: *P. v. grandiceps* Forster, with heavy tassels on all tips and fronds, 15 to 18 inches long; *P. v. bifido-cristatum*, a narrow form with smaller tassels; *P. v. glomeratum* Mullins, with curious bunchy semi-crested fronds, no two of which are ever alike; *P. v. pulcherrimum*, a giant form, with thrice divided broad fronds, a grand variety; *P. v. grandiceps* Parker, bearing heavy crispy bunch crests at the top of almost bare stalks, and finally *P. v. longipinnatum*, found by ourselves at Killarney, with long slender side divisions about $3\frac{1}{2}$ inches long and pointed. These were originally planted on the surface, burying the roots proper and pegging down the rootstocks, and now, after some five years, they have taken full possession and push their fronds from the sides as well, forming a grand group. Each spring we give them a mulch of burnt fern fronds, *i.e.* ashes mixed with a little soil, and this seems to benefit them greatly, as they rise with increased vigour every season. They also remain green and fresh throughout the winter, and though frozen in severe weather, the glass being their only protection, they quite recover themselves when the thaw sets in, and retain their verdure until the new growth starts to replace them.

We next come to a series of pots and pans, the latter accommodating specimen plants standing on (not in) red-ware saucers, which are kept filled with water and are usually filled with roots as well. The pans are shallow and about 15 inches across, sufficient for a good plant to attain its maximum development. Here we have a series of the *cambricum* or Welsh *Polypody* section, different entirely from the above, except *P. v. pulcherrimum* which, however, they far exceed in the delicacy and extent of their division. There are five types of these, all distinct, viz., *P. v. cambricum*, the ordinary form of it, with fronds nearly 2 feet long and 8 or 9 broad, the side divisions being 2 inches wide and deeply cut into long leafy-pointed sub-

divisions, somewhat overlapping each other, and of a thin papery texture, as different as possible in every way from the normal type; next comes a distinct improvement on this, *P. v. camb. Prestonii*, not so large growing, but much denser and more finely cut; next another variant, *P. v. camb. Barrowii*, a stiffer and bolder grower and quite distinct, but not so dense; then *P. v. camb. Hadwinii*, again distinct and very erect, and, finally, a form which we believe to be *P. v. camb. Oakleyæ*, a dwarfed *cambricum* very finely cut.

In another grand group, close to these are plants of the old *P. v. cristatum*, prettily tasselled, and a form given us by Mr. G. W. Wollaston, as found at Scarborough, with heavier tassels.

We next come to one of the most remarkable forms of all known as *P. v. Cornubiense* or *elegantissimum*. This was found on an ash pollard in Cornwall, and has its fronds divided over and over again into long slender segments, so that they have almost a moss-like appearance at their best. They have, however, a peculiar trick of reverting partially to the quite common type, producing also fronds which are beautifully divided but on coarser lines, the result being that in one and the same specimen we may see a normal frond, with a single pinnule finely divided, associated with smooth-edged plain ones, or conversely, a finely divided frond, with a single normal division, or a frond made up of all three types, fine, intermediate, and common; some carefully selected forms, like *P. v. trichomanoides*, display this tendency less and sometimes hardly at all.

Mr. Clapham, of fern renown, managed to cross this variety with *P. v. bifido cristatum*, described above, and we have a specimen of this which, owing to this reversion tendency, bears about seven distinct sorts of fronds, viz., normal, true *bifido cristatum* and fronds, with these two characters cropping up indiscriminately in conjunction with the coarse and fine types of *Cornubiense*, tasselled and plain, a very comical instance of want of determination, as the fronds evidently start, with their minds, so to speak,

only half made up as to the form they should assume, and this they change repeatedly as they progress.

Then we have saw-toothed varieties intermediate between the common and the much divided types, and these on grand and dwarf scales, and, finally, we have *P. Schneiderii*, the offspring of a cross between the great exotic *Phlebodium aureum* and *P. v. Cornubiense*, a giant *Cornubiense* with all its vagaries aforesaid.

We think we have now said enough to show that our common *Polypody* has capabilities of which probably most of our readers were ignorant. C. T. D.

POLYSTICHUM ACULEATUM AND ANGULARE.

By DR. F. W. STANSFIELD.

For some years I have had a plant under the name of *P. angulare plumosum grande*, *Moly*, and have noticed all along that it has a firmer texture than the majority of *angulares*, approximating to that of *Pateyii*. The cutting and form of the pinnules, however, were those of *angulare*, *i.e.* stalked with square shoulders and more or less decom-pound.

In the spring of this year the plant had a clean single crown, but for some reason only half of the circle of fronds developed, the rest remaining dormant, but still firm and quite alive. These spring fronds were of the usual *angulare* character, vigorous and very handsome.

Towards the end of July the dormant half of the crown began to develop, and when the fronds were completed they were found to be quite of *aculeatum* character, *i.e.* narrower than usual, of thick texture and glossy surface, with stalkless wedge-shaped pinnules, but still plumose and barren as usual. The plant thus presented the unusual character of a single crown, one half of which was *plumose angulare*, and the other half, *plumose aculeatum*! Now (end of September) a little offset is growing from the side of the crown, the fronds of which are, if possible, still more

definitely *aculeatum* than the large fronds, but only because, being smaller, they show less of the *plumose* character. There is the usual "lobatum" type of young *aculeatum*, the pinnules tending to become confluent and the edges of the pinnules quite prickly. It would be interesting to know the experience of other growers who have this beautiful variety; I have heard from one (Mr. J. A. Wilson), who has had the plant for more than twenty years, but who has never seen any symptoms of *aculeatum* about it.

Reading, September 27th, 1909.

This case is extremely interesting as evidence of the very close relationship of *P. aculeatum* and *P. angulare*. Though in the vast majority of instances the two species adhere to their distinct specific characters as normals, among the abnormal forms, and especially in some of the "grandiceps" types, there has always been differences of opinion as to which species they belong, and it is obvious that any *P. angulare* sport, which involves a thickening of texture or an approach to *P. aculeatum* make, renders certainty impossible, especially as both species often affect the same habitats and grow side by side. Quite possibly for this reason the dubious forms may be natural hybrids, for Mr. E. J. Lowe was the first to demonstrate that the two species could be crossed, as was evidenced by his *P. hybridum*, a cross between *P. ang. Wakeleyanum*, a *cruciate angulare* and *P. ac. densum*, a congested *aculeatum*. A hybrid origin might, of course, account for Dr. Stansfield's experience, and also for the intermediate "sports" alluded to. We have ourselves found a plant exactly of *angulare* cutting, but equally exactly of *aculeatum* texture and lucent surface.

EDITOR.

POLYSTICHUM ANGULARE: VAR LINEARE CRISTATUM.

We have received a division of a very prettily crested form of *lineare* from Mr. Joe Edwards, of Moston, Manchester. Neat tufted crests at all terminals, associated with the characteristic form of *lineare*.

EDITOR.

FERN HUNTING IN WINTER.

Although we have only had one experience of winter fern hunting in this country, we were so abundantly convinced by that one that it was not only profitable, but in some respects presented advantages over other seasons, that we feel that we can honestly recommend it. The deciduous species, such as Lady Ferns and most of the *Lastreas*, are, of course, placed out of court by their invisibility, but the evergreens, the Shield Ferns, *Hartstongues*, *Polypodium vulgare*, *Blechnum spicant* and all the Spleenworts retain their foliage in congenial districts in such good condition that varieties may easily be recognised.

The main advantage in winter hunting is, that while in the summer and autumn vast numbers of ferns are mixed up and more or less hidden by various rank growths of other vegetation, most of this, being deciduous, disappears when frost sets in, and this permits of much easier inspection of the associated ferns than at any other time. A handicap in the late summer months and the early autumn ones is, that the mixed growth of wayside ferns and weeds in the roads and lanes is ruthlessly cut down, for tidiness sake, so that perhaps for miles, except in the higher parts of the hedges and banks, nothing is left of the ferns but the stumps of the fronds, so that the chance of detecting variations is practically *nil*. Later on, however, there arises a fresh growth of the ferns, so that by the time the growing season is over they are again in evidence, to reward the keen search of the variety hunter, should any variety exist.

As a consequence of these facts, it will be seen that, leaving the deciduous ferns out of the question, the whole of the winter and the early spring present capital opportunities for hunting, and reduce the off-season to a minimum. As a matter of fact, as mentioned in a previous article, a winter hunt at Christmas in the Torquay district yielded some very good finds of *Hartstongue*, in a locality, moreover, so much within the town limits, that ferns of any kind were very scarce. One of these, found high up

on a brick wall, has proved to be unique, since it has turned out to be one of the curious ferns known as *dimorphic*, i.e. producing two distinct kinds of fronds both consistently abnormal. In one set the fronds are papery and simple, with a small finally divided tassel at the top, while in the other set the fronds branch, the divisions bearing large much-divided tassels of a somewhat bunchy character. In addition to this, these latter fronds regularly produce proliferous bulbils, singly or in pairs, at the point where the stalk enters the leafy portion, and also in the angle at the point where the branches diverge.

Bulbils are by no means uncommon on abnormal *Hartstongues*, occurring sometimes on the faces of the fronds, as in O'Kelly's *cristatum viviparum*, and sometimes when fronds have more or less aborted, bulbils then being engendered on the stump left. No case, however, is recorded of stem bulbils of the class described occurring regularly on uninjured fronds, precisely as they occur on the proliferous Shield ferns. This fern was frozen so tight into the chink it occupied that only a piece could be cut out, now a pretty plant, and in itself was a good reward for a fern hunt of an hour or two on a bright frosty day at Christmas.

C. T. D.

THE HYBRIDIZATION OF FERNS.

It may interest our readers to know that more than one well certified case of hybridization, by means of conjointly sown spores of different species has been recorded, and that the plants so produced are still in existence. Mr. E. J. Lowe first succeeded by sowing a cruciate variety of *Polystichum angulare* with a somewhat dense form of *P. aculeatum*, the result being a cruciate *aculeatum*. Mr. Schneider, in Messrs. Veitch's nursery at Chelsea, also obtained the remarkable hybrid named *Polypodium Schneiderii*, by sowing our native species and variety, *P. vulgare elegantissimum* with *P. glaucum*. The double parentage in this case is peculiarly evidenced by the fact that although the fern grows as large

and as robustly as *P. glaucum*, it is an exact replica on that large scale of the comparatively small *P. v. elegantissimum*, and is, moreover, nearly hardy. The evidence is further strengthened by the fact that *P. v. elegantissimum* is *polymorphic*, bearing several distinct types of fronds, viz. normal, very finely dissected, and intermediate, *i.e.* more coarsely divided, and the hybrid does precisely the same, even to the fact that one and the same frond may display all three characters in the most wayward way conceivable.

Among existing varieties of British Ferns there is a considerable number of undoubted crosses. One form of *Polystichum angulare* (*P. ang. polydactylum*) appears to possess an extraordinary faculty of imparting its *polydactylous* character to any *Polystichum* it is sown with. There are scores of other varieties which have thus been rendered *polydactylous* by conjoined sowing with this fern, and the fact that the new character is due to this crossing and not spontaneous, is practically proved by a parental defect common to all the offspring, viz., pinnæ here and there which are not so characterized. I have seen a very large number, and never found an exception to this. Others might be cited, but these are sufficient to prove beyond all doubt that cross fertilization does occur, both between species and varieties. Given, indeed, a somewhat dense mass of prothalli of two kinds, and a flooding when they are mature, the water must be pervaded by the fertilizing antherozoids, which can thus find their way to alien prothalli and so fertilize them. Given, too, a purposed crossing with two distinct forms, and a percentage of progeny showing both types conjoined, and we are certainly entitled to attribute such result to cross fertilization, though we may not have been able, as with flowers, to bring the two distinct reproductive elements together manually, as can be done with pollen grains.

C. T. D.

PIONEERS OF THE FERN CULT.*

By DR. F. W. STANSFIELD.

- DR. (now SIR) W. H. ALLCHIN, a London physician, who early devoted attention to ferns, and made some successful finds. Author of a classification of fern varieties which was probably never published.
- J. M. BARNES, of Levens, Westmoreland. An enthusiastic cultivator and keen judge of ferns. The most successful among the early hunters in the north. Finder of dozens of varieties of *Lastrea montana*, including several of the very best. The fern authority of the Lake district in his time. Died about 1890.
- T. E. BENNETT, Bletchworth, Surrey, deserves mention as the earliest finder of whose discovery there is explicit record, having found *Polyp. v. omnilacerum* in 1848.
- W. C. CARBONELL, of Usk, Mon. Perhaps scarcely a pioneer as he was a fern pupil of Colonel Jones, but he was a faithful stalwart during the dark ages of the later seventies and eighties when ferns were most out of fashion. He obtained much success as a raiser of *angulares*, his *divisilobes "stipulatum"* and "*longipinnatum*," being among his greatest achievements. Found a pretty *perserrate angulare*. A most genial and kindly man. Bequeathed his entire collection to Kew Gardens, thus founding a national collection of British Fern varieties.
- A. CLAPHAM, of Scarborough, an enthusiastic cultivator, hunter, and raiser of ferns, who flourished in the sixties. His *Scolopendrium Claphamii* was probably the earliest of the fringed *crispums*, and was for some time unique, though now superseded by the modern *fimbriate crispums*. Found a very fine form of *A. trichomanes incisum*.

* These notes on the principal pioneer British Fern hunters and raisers have been kindly compiled by Dr. F. W. Stansfield from his personal recollections. They have been arranged alphabetically to facilitate reference, and their order does not therefore indicate in any way their relative status. The names of numerous other devotees to the cult have been handed down to us in connection with their discoveries, but the list certainly embraces those whose labours have been of the greatest importance in the earlier days, and whose memories should therefore be held dear by all lovers of our Native Ferns.—EDITOR.

F. CLOWES, medical practitioner, of Windermere, is best known as the first finder of *L. remota* as a British plant. It was then supposed to be a new British species, but is now, with good reason, believed to be a hybrid. Found a *marginate Polypody* in 1854. *L. remota* has since been found by several other hunters.

JOHN DADDS, of Ilfracombe, an early hunter and grower of ferns. Did not approve of raising fern from spores, as it "spoiled the market for hunters." He will, however, be probably best remembered as the *raiser* of the *polydactylous Lastrea* which is known by his name, and which is the most graceful of that section. Finder of *Adiantum C. V. plumosum*. Died about 1904.

C. ELWORTHY, gardener to Sir G. Trevelyan, Nettlecombe, Devon, one of the most successful of early hunters, being very active in the fifties. His *P. ang. plumosum* and *rotundatum*, are well-known and still standard forms.

WILLIAM FORSTER, of Salford. A thorough-going enthusiast, as proved by his success in growing ferns under the most depressing conditions in the heart of a large town. An early and successful hunter, though not one of the earliest. A working man, whose scanty holidays were all fern-hunts.

EDWIN F. FOX, surgeon, of Brislington, found a reflexed *Athyrium* in 1850, and continued an enthusiastic lover, cultivator, and raiser of ferns until his death about 1892. Was co-worker with Col. Jones in the production of the *plumose divisilobe* strain of *angulares*.

PATRICK NEILL FRASER. An early hunter and cultivator of ferns. Did valuable work for many years by publishing periodical lists of all the known varieties of British ferns. Remained an enthusiastic fern-lover to the time of his death.

ROBERT GRAY, Alphington. The pioneer hunter of *angulare brachiato-cristatum*, of which his form found in 1854 was probably the earliest, and, when in its best character,

is still unsurpassed, although probably a dozen finds of the same type have since been made. Mr. Gray found many other good varieties.

W. BARNARD HANKEY, of Cranleigh, Surrey, a skilful cultivator and raiser and successful hunter; found a *P. ang. brachiato-cristatum* in 1866.

J. K. HODGSON and MRS. HODGSON, of Ulverstone, were both early fern lovers, growers, and successful finders of varieties, both having good records in the sixties. Perhaps their best find was an *A. f.f. plumosum*, made by the lady in 1870. This is a beauty, and a true *plumosum*, although somewhat ungallantly named *sub-plumosum*.

CHARLES JACKSON, of Barnstaple, an early and very successful hunter of ferns. Found the first *angulare pulcherrimum*; also *Asplenium lanceolatum microdon*, *A. Adiantum-nigrum microdon*, and *A. marinum plumosum*. These ought to be sufficient to perpetuate his memory for centuries at least.

J. JAMES, Vauvert, Guernsey. A mighty hunter in the fifties and sixties. His *A. f.f. corymbiferum* is still one of the most perfect examples of pure crestring.

CAPTAIN (afterwards COL.) A. M. JONES. Great as a hunter and cultivator, but perhaps greater still as a raiser of new varieties. Was the originator of the *plumose - divisilobe* strain of *angulares* (among them *Baldwynii*), which includes still some of the most beautiful of British ferns. Raised a great number of first-rate forms of *angulare* by crossing and otherwise. No one did so much for ferns as did "the Colonel" in his time. A faithful and generous friend, and the best type of an English gentleman. Died suddenly in 1889.

MISS FANNY KITSON, a clergyman's daughter, of Torquay, was an early admirer and grower of ferns, and a hunter of varieties. Found several good things in *P. angulare* and *Scolopendrium*.

EDWARD J. LOWE, F.R.S., etc. Well known as a voluminous writer on ferns. Began to cultivate British ferns in 1842, and continued an enthusiast until his death, about 1900. A hunter of varieties to some extent, but much more successful as a raiser, and especially as a hybridizer. Raised a hybrid between *Scolopendrium* and *Ceterach*, which, unfortunately, did not live long to commemorate the achievement. Raised a *cruciate aculeatum* by crossing that species with a *cruciate angulare*. A very genial man.

J. E. MAPPLEBECK, an early hunter and grower of ferns. Found and raised many good things—perhaps his best being *P. ang. aeroclodon*, found in 1862, which remains unique and is still rare. Still living.

JAMES MOLY, of Hawkchurch, Axminster, afterwards of Charmouth. Probably the greatest and most successful of hunters, especially among *angulares*, of which he has found literally hundreds of good varieties, including many uniques. His greatest achievements are possibly his *pulcherrimums*, of which several are unfortunately lost, but two of which still remain. His *plumosum grande* is probably the noblest purely *plumose Polystichum* ever found or raised. It is intermediate between *angulare* and *aculeatum*. Has been also very successful among *Scolopendriums*. Mr. Moly is still living.

CHARLES MONKMAN, of Malton, Yorks., an early and successful hunter, especially among *Athyriums*. Found *A. f.f. aeroclodon* in 1860.

THOMAS MOORE, Curator of the Botanical Gardens at Chelsea, the "Physic Garden" of the Society of Apothecaries, was the first writer to give systematic names to varieties of ferns. A keen and critical botanist, and an authority on fern species as well as varieties. Author of "Nature-printed British Ferns," the plates of which have never since been equalled. For many years *the* authority on British ferns.

ROBERT MOULE, of Ilfracombe, another early hunter, will be remembered as the finder of *A. f.f. Clarissima*, though many other good things went into his bag. He also raised the crested form of *Cystopteris fragilis*.

REVEREND CHARLES PADLEY, sometime Rector of Littlehampton. Was a first-rate judge of ferns and a mighty hunter of varieties; probably in his day the most successful hunter among *angulares*. Finder of an early *P. ang. pulcherrimum*, the best *angulare triplinatum*, and hosts of others.

HENRY PARKER, Weston-Super-Mare, found his very fine *Polypod. v. grandiceps* in 1854.

G. S. PATEY, formerly of East Hendred, Berks., now of Newton Abbott, Devon, a successful hunter in the sixties and seventies. His magnificent *P. ang. plumosum (Pateyii)*, and his *perserratum* will be an enduring monument of his fame.

W. H. PHILLIPS, happily still among us, has through the greater part of a long life been an enthusiastic hunter, cultivator and fern-lover. Has found a great number of varieties among most of the species of British ferns, the greatest number being *angulares*. Perhaps his best find is *P. ang. setoso-cuneatum*, which, however, has been paralleled by Mr. Moly. President of British Pteridological Society, 1904-5.

ROBERT SIM, of Foots Cray, a successful nurseryman, grower and raiser of ferns. Raised *L. pseudo-mas ramulosissima*.

ABRAHAM STANSFIELD, of Todmorden. An excellent general botanist. Began very early to cultivate ferns, and published a catalogue in 1852. Did much to popularize and extend the cult. Found many good varieties, though perhaps nothing absolutely unique. Was one of the first to deliberately cross varieties, and raised a crested *cruciate Athyrium (Pritchardii cristatum)* about 1865 in this way. Also made some very successful crosses between *A. f.f.*

plumosum and *Craigii*, and between *plumosum* and *congestum*. Died 1880.

MRS. AGAR THOMPSON, sister of the Rev. C. Padley, was the finder of many first-rate things, including a *P. ang. pulcherrimum*, *P. acul. acrocladon* (1858), *P. ang. Thompsoniæ* (*cristatum*).

GEORGE WHITWELL, the esteemed Secretary of the B. Pt. Soc., although not one of the earliest hunters, has been one of the most successful in the north, having found over twenty forms of *Lastrea montana*, including a *plumosa*, which is perhaps the best yet recorded. His finds among *Blechnum* include *paradoxum* which is quite unique among ferns.

JOHN WILLS, of Chard, another medical fern-lover, and a very successful hunter and grower. A pupil of Mr. Moly as a hunter. Finder of perhaps the most thorough of the *angulare pulcherrimums*, though it is doubtful whether this is now in existence. Also the distributor of *aculeatum pulcherrimum*.

JOHN A. WILSON, of Bowness, an early hunter, who is still alive: found some good things in the sixties and seventies, including *Polypod. v. serra*, *L. paleacea cristata*, and *ramo-cristata*, and *L. montana crispatisima*. Mrs. Wilson was also a successful hunter.

GEORGE B. WOLLASTON, of Chiselhurst. Next in point of time as an authority on names to Mr. Moore. An enthusiastic hunter and cultivator of ferns. Finder of many excellent varieties of *P. angulare*, of which his *acutilobum* and his *plumosum* are, perhaps, the best known. He it was who first defined and named the three sub-species which make up the aggregate *Lastrea Filix mas* of Presl. He was also the originator of the descriptive system of naming varieties, which is now generally accepted.

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CHARLES T. DRUERY, V.M.H., F.L.S.

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POLYSTICHUM ACULEATUM PLUMOSUM GREEN (see page 50).

THE BRITISH FERN GAZETTE.

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EDITORIAL NOTE.

It is very satisfactory to be able to announce that the issue of the "Gazette" has resulted in a large increase in the membership of the Society, including several in the United States and Canada. In this issue we are happy to give several interesting contributions from members, and trust that in future ones these may increase and constitute a fund of practical information for fern lovers generally. The Editor would also be glad to receive specimen fronds of new finds or special raisings of obvious merit, or photos of same, accompanied by stamps for return postage, if such be necessary.

As previously stated, the annual subscription of 5s. (payable either to the Secretary or the Editor) entitles to membership and four issues of the "Gazette," and to the next issue we shall append a list of members to facilitate that intercommunication which is one of the most interesting features aimed at.

A copy of the "Gazette" will be gladly sent to any one likely to become a member. All communications, MSS., etc., concerning the "Gazette" should be addressed direct to the Editor, 11, Shaa Road, Acton, London, W.

EDITOR.

OUR FRONTISPIECE.

This represents another of the very beautiful and, indeed, unique section of *P. aculeatum* raised from *P. ac. pulcherrimum*, one form of which was depicted in our frontispiece to No. 1, the parental form being also shown on page 4 of that issue. This variety occurred in Mr. C. B. Green's batch of seedlings, and, as will be seen, differs very markedly from the rest of the "gracillimum" section, approaching in foliose dissection and plumose character the wonderful *P. angulare* divisolobes of Col. Jones and Dr. Fox. It has been consequently named *P. ac. plumosum* Green, and deservedly obtained an award of merit from the Royal Horticultural Society. Fortunately, this new varietal section of the species, despite its extra delicacy of cutting and appearance, has inherited the parental robustness of character, though time has not yet sufficed to attain similar size. The production of spores we think is doubtful, but a tendency has already been shown to the production of bulbils and offsets, which practically secure true propagation of the several types produced. The photo was kindly supplied by Mr. C. B. Green.

EDITOR.

THE KING OF THE MALE FERNS.

LASTREA PSEUDO-MAS CRISTATA.

We have before us as we write a splendidly grown specimen of this truly regal British Fern, the fronds of which are fully four feet in length, while the trunk, which

thirty years of proper culture has enabled it to develop, adds a full foot and a-half and constitutes it a thoroughbred British Tree Fern. This plant belongs to the hard evergreen section of the Male Ferns as distinct from the softer section "felix-mas," the common Male Fern, and therefore is as ornamental in the winter, when foliage is precious, as in the summer when it becomes one of a host among deciduous species. It is heavily and symmetrically tasselled at the tips of its fronds and pinnæ, or side divisions. This imparts a highly ornate character to it, far and away eclipsing the simpler beauty of the normal form of the species.

The original plant of this was found in Cornwall, and as it is particularly generous not only of spores but also of offsets, it has become very generally distributed, and even in those benighted districts where the natives live up to their necks, so to speak, in ferns, and yet don't know a *Hartstongue* from a Lady Fern, we have been deluded into long walks by rumours of So-and-So having a rare fern in his garden, only to find that a specimen of the "King" has found its way there. Both in Devon and in Kent this has occurred, in both cases an apochryphal rumour existing that the fern was a local find, a reputation we felt bound to destroy.

Thanks to the fertility above mentioned and the extremely easy culture of the Fern, no collection exists without one or more specimens, but this means little so far as adequate recognition is concerned, for it should not merely figure in collections, its hardiness, beauty and cheapness entitle it to a place in every rockery as well as to a high post of honour under glass. To attain the result, however, which we have described, viz. the aspect of a Tree Fern, there is just that touch of careful and persistent culture required, which makes a fern plant precious. If we have nothing to do but dump a plant into a pot and it straightway grows like a weed, producing offsets in all directions and becoming a bush, we are apt to think little of it, but if, on the other hand, we can, by checking its exuberance in certain directions, induce it to assume a specially beautiful character

and then maintain it, we feel we have, as it were, a "finger in the pie," and that some of the credit is due to ourselves.

This is precisely the case with the "King of the Male Ferns," that very gift of fertility in offsets above alluded to has to be persistently checked if we want a Tree Fern; if we obtain a crown of the plant and instal it in a pot, in a short time it will send up a charming shuttlecock of its tasselled fronds and promise to be all right, but very soon we shall find little fronds peeping out at the base of the big ones and all round a little forest of youngsters will appear, each one developed from a bulbil near the base of the big fronds. These grow apace and in time we have a dense bush in which the original shuttlecock is indistinguishably merged, while the whole lot are fighting for existence in the limited area of soil which should only serve for one crown. Hence a mass of medium-sized fronds, pretty but mediocre. If, however, so soon as these little basal fronds become tangible plants we prize them off with a blunt knife, we shall find them come away with a little bunch of roots, all ready to give to admiring friends or pot up for additional specimens. These removed, more will come in time, but we must persist, and presently we shall see that the original shuttlecock, freed from competition at its roots or contributions from itself towards a brood of youngsters, is fattening up its crown tremendously as a preliminary to sending up a circle of great robust fronds with double the development of those in the bush. Each year this goes on until the maximum height is attained and a trunk begins to form by the annual crown always springing up within that of the previous year at a slightly higher level, while the old fronds, dropping in the late spring as they are pushed outwards by the new ones, leave their stumps as a contribution. All this time the youngsters will have been trying to assert themselves, but as time goes on the tendency decreases, and, finally, the old plant has obtained such a foothold that if any appear they are too far from the ground to become rivals, though they still should be removed.

The trunk of our specimen by no means represents a full-sized one, as we have seen very old plants with trunks fully two feet high, but at this stage, unless grown in a damp atmosphere and the trunk is frequently sprinkled, the size of the fronds is apt to dwindle. This is due to the fact that, like all trunk-forming or tree ferns, each year's growth sends down its independent bundles of root fibres from the bases of the new fronds, and these, naturally, if they have to travel far down a dry trunk, are apt to suffer on their way to the soil. The trunk is consequently strengthened year by year, and is gradually built up by these interlacing roots and the old bases of the decayed fronds. Apart from its beauty, hardiness, evergreen character and permanence as a pot plant, it is extremely interesting from the scientific side, since investigation has shown that its spores are peculiar in yielding fresh plants without any fertilization process, simple buds being produced on the prothallus, or little green scale, formed by the spore. It is probably due to this simplification that no fern is more easily raised from spores, and, indeed, it comes up freely as strays among sowings of other kinds and in the fernery generally. This faculty, however, does not prevent variation, and several very different varieties have certainly sprung from the "King." *L. p. m. cristata angustata* is a very narrow form of it, less robust, but very good, and Mr. Cropper has been fortunate enough to raise two lovely refined forms of it, of such a delicate character as no cultivator could have hoped for from such a stock. One of these, *L. p. m. fimbriata cristata*, has thin semi-translucent fronds, prettily tasselled, and with a fine-toothed fringe on all edges. This is a gem, and comes perfectly true from its spores. The second one raised by Mr. Cropper is presumably a secondary sport from this, though we can only guess so. It is quite distinct, but much more beautiful in its fringing, which latter feature, moreover, is endowed with the remarkable faculty of growing out into prothalli, upon which buds appear and produce

characteristic plants.* We, therefore, see that the subject of our remarks has many points of interest besides its intrinsic beauty to recommend it, and, to our mind, by no means the least of these is its longevity, since there are few pot plants which will last their owner's lifetime without depreciation, as will the "King of the Male Ferns" when once properly established as a Tree Fern.

CHARLES T. DRUERY, F.L.S., V.M.H.

THE NAMING OF FERN VARIETIES.

We do not propose in this note to enter into the vexed question of nomenclature generally, which, in point of fact, is no such bugbear to those within the cult as it appears to be to outsiders, but to give a few suggestions as to the distinctive naming of crested forms. The phenomenon of creasing is fairly general among Ferns, and is evidenced in all grades from a mere forking of the terminal points to such a general branching of the frond that the normal flat growth is entirely eliminated, and a mossy bunch results, which may render similarly affected varieties of quite different species all but indistinguishable from each other. We see this, for instance, in the Lady Fern and the *Hartstongue*, *A. f.f. unco-glomeratum* and *S. v. Kelwayi* *densum*, both forming dense and moss-like masses, and hence very similar in appearance. Much confusion, however, exists in the naming of the simpler crested forms as regards the extent of tasselled division and its

* In this respect *L. p. m. pericristata apospora*, as it has been named, is botanically one of the most remarkable ferns we know of, since in it are combined the two phenomena of "apospory," or production of prothalli on the fronds, and "apogamy," or production of young plants without a fertilization process, these originating as simple buds. This involves such an economy of vigour that tips of pinnae laid down and kept close have yielded plants in a week or two, and as the fern prothalli bud out and ramify into others, a single tip is capable of filling a pot with prothalli and yielding an indefinite number of plants. Unfortunately, in these plants there is a great lack of constitutional vigour, and they rarely assume any great size.—C.T.D.

character. Broadly speaking, it falls into two sections, flat fan-like division and bunch division. The flat cresting may be roughly graded thus: simple forking "furcatum" or "furcans," confined to two or three divisions, digitatum or fingered up to five or six, polydactylum up to ten, multifurcatum up to a score, all these divisions terminating in points and not dividing again, and all spreading in the same plane—fan-fashion. If the primary divisions fork again, we get true cristate or crested forms, and, still adhering to the flat expansion, we may term them cristulatum, cristatum, or, in the case of divided ferns, percristatum, if the pinnules as well as the frond tip and pinnæ are crested. When the flat mode of expansion is replaced by a sort of radiating division producing tufts or bunches, they become corymbiferous—"corymbiferum," and when these are large and heavy, the "grandiceps" form is attained, provided the terminal bunch of the frond is so characterized. An extreme form of this, producing dense ball-like crests, may be termed globosum. All these terms apply to fronds whose mid-ribs are not otherwise divided than at the tips, but when these split up lower down into branches, this character is indicated by ramosum, ramosissimum, ramulosissimum, or, in extreme cases, conglomeratum. This ramose character is indicated in compound varieties, *i.e.* in which other characters occur in conjunction with it, either by the prefix ramo or the addition of the names of the more developed grades mentioned above, thus ramo-digitatum or muricatum ramulosissimum.

These rules will cover a very large range of forms as a guide to finders or raisers, but it must be remembered that fern species have been endowed by their botanical godfathers with names indicating different sexes, and since these sexes are purely imaginary, in those terrible synonyms which are the bane of all studious plant-lovers, one and the same species may have been christened, say, John by one godfather, and Jenny by another. Our common Male Fern,

for instance, under the name *Lastrea* is treated as a lady, and under that of *Nephrodium* as a neuter, and as grammar, both Latin and Greek, demands a gender agreement between the adjective and the subject, we must write *Lastrea filix mas cristata* and *Nephrodium filix mas cristatum* to be correct.

The moral of all this is that though we have given all the characters above mentioned the termination "um," "a" must be used instead where the specific name is feminine. This is often shewn by an "a" termination as the neuter gender is evidenced by "um," but not always. *Pteris aquilina*, for instance. It must, of course, be understood that the above remarks only touch the fringe of the subject of nomenclature, but, as we have said, they will assist in a very large number of cases in which now considerable confusion exists owing to the lack of guiding principles.

C. T. D.

FERN CURIOS.

Although it is our aim in this "Gazette" to encourage the cultivation of our British Fern varieties in the direction of improvement of type and enhancement of beauty, it is not right to ignore entirely those curious "sports" which Nature occasionally contrives, and which in their way are even more interesting to the student of variation than those which involve, to a large degree, mere extensions of growth on otherwise normal lines. All the uncrested *plumose* forms, for instance, are of this last description, and many others, though varying much in detail, adhere in general structure to the normal plan. As examples of the types we have in view, we may take the various *truncata* varieties, such as *Lastrea montana truncata*, *A. f. f. excurrents*, *L. f. m. truncata*, *Scol. v. periferens* and *cornutum*, and several forms of *P. vulgare*. In all these, for some occult reason, the growth at the frond tip and, in the divided ferns, the pinnæ as well, suddenly stops and ends more or less squarely, the midrib projecting for a short distance like a thorn. This peculiarity is truly

conveyed to the offspring by spores, and there is some little evidence in favour of its causing a sort of prepotency in the spores, as they certainly produce plants very freely; and in Col. Jones' records it is stated that in a certain wood near Portishead *S. v. peraferens* existed in abundance. A form of this, raised by ourselves, shows the truncate character in the basal lobes (*S. v. tripceferens*), and *A. f. f. excurvens* shews it clearly, even in the pinnules. This would appear to form a converse character to *cristatum*, in which the midribs are abnormally multiplied and extended instead of becoming aborted, for that is what practically truncation implies.

In the Hartstongue we have numerous instances in which the normally smooth surface is broken up into roughnesses of various types, rugose, muricate, marginate, supra and sub-lineate and so on; and in this case we have a curious parallel in the crested Begonias among flowering plants, where the surface of the petals breaks out into a sort of incrustation on similar lines. This peculiarity is truly transmitted through the spores, and as the late Mr. E. J. Lowe demonstrated by a very large number of crosses, can be imparted to other varieties by conjoined sowing, not, it must be said, always to their advantage, since in our opinion a little chamber of horrors might be contrived by a selection of many of these. Then we have the medio-deficiens type in *Athyrium*, *L. filix mas*, and *P. angulare*, in which the minor divisions of the pinnæ next the midrib are either absent or represented by little thorns, their aborted midribs. This character, as a rule, puts the fern decidedly outside the ranks of the *élite*, but by no means always, provided it be on regular and symmetrical lines. An *Athyrium* found by us as a seedling at the roadside in Wigtonshire has this character clearly shewn in the pinnæ, as well as the frond, with a pretty result; and some of the lineare sections of *P. angulare* partake of this character, and yet are quite eligible for select collections. A number of quite independent sports of Lady Ferns of this kind

have been found. There are, however, a few of the "curio" tribe which are simply ugly, appearing to be affected with a genius for going wrong in their structure. A form of *Lastrea* found by Mr. Phillips in Ireland, *L. f. m. monstrosa*, seems unable to perfect any of its parts; and it is recorded of another find of this description, of which, nevertheless, the discoverer was very proud (this was in the old days, before the reformation), which being shewn, we believe, to Col. Jones without his being adequately impressed, the finder said: "Ah! but you should have seen it last season, when there was not a single bit of it right." Near Aberfeldy, a few years ago, we found a large bush of Male Fern of this type, but it is doubtless there still.

Among the "curios" representing peculiarly eccentric departures from the normal plan of growth, that wonderful Lady Fern, *A. f. f. Victoriæ* ranks as *facile princeps*. The phenomenon of cruciation, or the formation of crosses, by the juxtaposition of opposite twin pinnæ or pinnules set on at a wide angle to each other, is not common. It has been found in *P. angulare* (*P. ang. Wakeleyanum*), in which it, however, only partially affects the fronds, and in our own find of *A. f. f. cruciatum* in Devonshire, in which the character is fairly evidenced both in the pinnæ and the pinnules, but in *Victoriæ* it is so thoroughly brought out that the fronds are like slender pieces of lattice work, and the pinnæ are composed of tiny crosses on like lines throughout. To add to this marvel, long, slender, pendulous tassels ornament the tips of frond and twin pinnæ, constituting it an absolutely unique form in all the world. Here we have a "curio" of such a thoroughbred nature as to entitle it to the foremost place of honour in every collection. The opinion has been expressed that the twin pinnæ are due to abortion of all but the two basal pinnules of the pinnæ proper, and that these are consequently enlarged by concentration of energy and thus assume the character of pinnæ, which naturally grow at the same angle as pinnules would have done and so produce the

effect described. In this case, however, there is not the remotest sign of an aborted midrib as seen in truncate ferns.

Another class of "Curios" is seen in the *revolvens* and *flexuose* types, in which the fronds are either rolled up, more or less, into tubes, or are eccentrically twisted. Both of these types depart from the general rule that the frond surface is arranged to catch as much light as possible, since by their curves and twists a large proportion of the frond is turned away from the light. Varieties in this direction have been found in several species. *P. angulare* has afforded a number, and we found a good one in Devonshire in 1908. *L. f. mas* has produced one, and *A. f. f. revolvens*, found by us in Scotland, is a very fine example, the pinnæ forming a series of ringlets on each side the frond. Flexuose forms of *A. f. fæmina* have been found several times, and examples have also turned up in *Scol. vulgare* of both types. The "revolvens" are naturally the prettier, and make handsome pendulous-fronded specimens. Incidentally, we may remark, that a successful cross between *revolvens* and good *cristate* forms is well worth trying for; so far, however, our own efforts in that direction have been fruitless. Curiously enough, in this connection, on our way from Windermere Station to Bo'ness some years ago to attend a meeting of our Society, we noticed that the Bracken on both sides the road was a thoroughbred *revolvens* type, and collecting a frond, we displayed it at the meeting where it was much admired, while much amusement was evoked when we pointed out that the majority of those present had passed it on the road, but failed to "spot" it.

To finish these notes with a little anecdote somewhat akin to this, it is told by Mr. G. B. Wollaston, that he was once accompanying an old lady on a fern hunt in a Devonshire lane, when he observed a splendidly crested *Polystichum*, which was being tickled by the feathers in the old lady's bonnet as she was stooping beneath it to examine something else. First sight, first find, is inevitable in fern

hunting, and as she was passing on, he had perforce to call her attention to it, and she never forgave him. The B. P. S. was, however, kinder.

C. T. D.

THE DECORATIVE VALUE OF OUR NATIVE FERNS.—I.*

The importance of British ferns for purposes of decoration is derived from two distinct but highly valuable qualities, which many of them possess. They luxuriate in places where little else will grow, and they attain—in the case of the finer varieties—to a beauty of form which is not easily rivalled. The conditions which ferns demand will be best realised by passing in review some of their typical haunts. Not far from the town of Sligo is a remarkable glen, as it is termed, but chasm would be the more suitable word; for a distance of some three-quarters of a mile the limestone formation has opened, and the result is a cleft whose sides sink, often perpendicularly, to a depth, at the deepest parts, of as much as 40 ft., while the width is only about 30 ft. From end to end the glen abounds in the most wonderful specimens of the Hartstongue Fern (*Scolopendrium vulgare*) that it has ever been my lot to see. Along the bottom they grow so close together that, except upon the central path, it is difficult to stir without crushing them under foot; and up the sides they climb, making every ledge their own, and adorning the whole with a varied wealth of green which is almost magical. Here, in addition to the limestone—which is a great help, though not a necessity—we find two pronounced features, shelter and moisture, and the moisture is of the right kind. With the help of the general conformation, and the trees by which it is supplemented, the ferns have got for themselves a home where no rude breezes come and where the sun's rays are subdued. They have also got the moisture which they crave; the drip and trickle from innumerable springs finds its way gently down the

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sides : in the few cases where the rock leans forward, so that the water cannot rest, no ferns are seen ; but wherever the sides lie back, and sufficiently retain the moisture, there rich drapery has come. Constant moisture, never stagnant, the glen supplies ungrudgingly. Even when the water reaches the bottom it cannot stay ; the general slope of the ground, which is on the side of a mountain, carries it off to the sea. One other important lesson in connection with the decorative use of ferns may be learned from this Sligol-glen—soil is of secondary importance. It is true that the growth is taller and more vigorous in the deep vegetable mould which has filled up the lower levels—the best soil will give the best results—but many a fine fern grows where it can have little but shelter and moisture for its comfort. Nor is this an isolated phenomenon. One of the most interesting “ finds ” in my collection was taken from a limestone wall beside a public road. The wall was built against a hill with a northern aspect. There was constant moisture percolating from above, and the aspect ensured shelter from the sun, but there was nothing of the nature of soil. Nevertheless, from top to bottom the masonry was covered with Hartstongues. Similarly, in limestone districts, where shelter and moisture are granted, disused kilns often become so overgrown as to suggest that the real object of their construction was to demonstrate what Hartstongues can accomplish in the way of decoration. Typical fern haunts, which further illustrate the need of shelter, are the rifts or clefts, as in the Arran Islands, where the Maiden-hair (*Adiantum Capillus Veneris*) grows, and the sea caves are made beautiful by the Sea Spleenwort (*Asplenium marinum*). I touch them lightly, and hasten on. If the Maiden-hair and Sea Spleenwort are asked to decorate, they will only do it under cover. In this paper it is the effects that can be got outside that chiefly concern us.

We take, then, a valley such as may be found in many parts of Wales or of Devonshire ; if it is narrow, so much the better ; a stream winds along the bottom ; its banks

and the steep sides of the boundary hills are clothed with trees. Down near the water you may expect to find the Lady Fern (*Athyrium filix fœmina*) growing to perfection. Where the current is gentle it seems to take pleasure in rising, as it were, from the stream itself. Not far off, but seeming to think more of securing the perfection of shelter, the Broad Buckler Fern (*Lastrea dilatata*) rises in sequestered nooks as high perhaps as your shoulder. Splendid as are its rivals, when cultivation has developed their graces, there are, in my opinion, none which in their native state can eclipse the stately beauty of this fern. As we climb higher up the sides, a new truth with regard to the places ferns will decorate introduces itself. So far we have found them prizing shelter and such moisture as is not stagnant, and appreciating a deep, light, vegetable soil. But look at that road which traverses the side of the valley far above the stream. If you examine the hedgerows which bound it, you will find them full of fern-life. Some whose acquaintance we have already made will be there, though very different in size and vigour; but now the Male Fern (*Lastrea filix mas*) and the Shield Ferns (*Polystichum aculeatum* and *Polystichum angulare*) become the prominent feature. It is not only in hedgerows that they flourish; all through the woods, particularly where groups of stones offer specially tempting homes, and in natural hollows, the Buckler and the Shield Ferns salute us with vigour of growth and symmetry of form. From the places in which we find them, it is plain that in their case we may dispense with a good deal of the moisture which the Hartstongue and the Lady Ferns demand, and plainly they are even less particular as to compost, being able to give good account of themselves in any ordinary soil. Like the others, they ask shelter and they abhor stagnant moisture.

There is one other fern which imperatively demands notice when the subject of outdoor decoration is uppermost—the Common Polypody (*Polypodium vulgare*). If the decoration of the greenhouse or the furnishing of the

choice outdoor fernery were in question it would be pleasant to include such gems as the Oak, the Beech, and the Limestone Polypodies (*P. dryopteris*; *P. phegopteris*; *P. Robertianum* or *calcareum*). But we are in search of decoration under ordinary open-air conditions; and we want in particular ferns that are easy to please, as well as fair to see. Beyond all the rest the Common Polypody, including its beautiful varieties, has power to give what we ask. It is, perhaps, more widely distributed than any of our native ferns, but if we are to understand properly what it can accomplish we must visit such localities as the County Cork, where it abounds, and attains to perfection. See that old domain wall, how the Polypody has possessed it. Whole roods of it are coped with the waving green of the fern. Where trees give shade, there the growth is most luxuriant, but even in full exposure to sun and wind the Polypody holds its own. If you pass inside and examine the lower courses of the wall, and the moss-covered ground at its base, there you will find great fronds fifteen, eighteen, and even more inches long. These, however, are conditions under which all our decorative ferns will grow. What we seek in the Polypody is capabilities all its own. Therefore we turn from the bottom of the wall and look up, to find branch after branch of the great forest trees turned into attractive natural ferneries by the enterprising aspirations of our fern. Thus we have a fern which, if it give its best results when shaded from full sun, can nevertheless be induced to face both sun and wind; so much we learn from the flourishing growth along the top of the wall. The happiness of the colonies in the trees further teaches that for considerable periods water may be withheld. A single feature remains to the Polypody in common with all the ferns that have been visited. Like the rest, it will have nothing to do with stagnant moisture. In the treatment of all ferns good drainage, as the gardeners call it, is essential.

H. KINGSMILL MOORE.

(*To be continued.*)

SOME ANCIENT USES AND BELIEFS IN FERNS.

BY WM. E. FARRER.

Ferns, apart from their graceful forms and glorious green foliage, contain medicinal and other properties. We read of days long passed, when the ancient Arabian and Persian physicians used the *Ceterach officinarum* very largely for splenic disorders. Likewise, in other foreign lands, from time immemorial, ointments, lotions, and other forms of healing concoctions, have been obtained from certain portions of their ferns. But it is not my purpose here to write of foreigners, but simply briefly on our own British ferns.

Two of our commonest species, namely *Lastrea filix mas* (Male Fern) and *Pteris aquilina* (the common Bracken), especially the first mentioned, are credited with being cures for intestinal worms, on account of their astringent qualities; many others of our ferns have the like properties in a less degree, principally contained in their stems.

The Royal, or flowering fern, *Osmunda regalis*, is, or was, used for the healing of sprains and bruises, in the form of an application. From the *Adiantum Capillus Veneris* (the British Maiden-hair fern) and other *Adiantums*, the soothing drink "Capillaire" is made by pouring boiling syrup upon the green fronds, and then flavouring the fluid by adding orange flower water; if this concoction be taken too strong, it is believed to be somewhat of an emetic.

The common Adder's Tongue fern (*Ophioglossum vulgatum*) was, and may be to the present day, frequently made up into an ointment by our country folk, and as an external salve in case of newly contracted wounds. What the exact healing properties are I know not, but faith, fresh air, and a good constitution, combined with what cured one's grandfather who lived to the advanced age of ninety—and who had suffered from some terrible lacerated wound, and when all other methods failed, was eventually cured by this application—the same will surely cure you.

Alkali is most prevalent in the Bracken (*Pteris aquilina*) and the Male Fern (*Lastrea filix mas*), and was used in the manufacture of soap and glass, and the dressing of leather. Beer also has been made from a preparation of these two ferns. The bracken in some parts of our land is cut, dried, and stacked, and then used for the bedding of horses and cattle in a similar manner to straw. The very young fronds of this fern, when just raising their crosier-like heads above the soil, are, I am told, most palatable, and much resemble asparagus in flavour.

The common Moonwort (*Botrychium lunaria*) was much thought of in centuries long gone by, by the alchemists and professors of magic, and the like. We often read in old works and manuscripts, what strange and wonderful power was attributed to this little fern, with its crescent-shaped leafy pinnæ. Hear what Cole has to say about it: "It is said, yea and believed by many, that the Moonwort will open locks wherewith dwelling houses are made fast, if it be put into the keyhole; as also that it will loosen the locks, fetters, and shoes from those horses' feet that goe on the places where it groweth." And of this opinion was Master Culpeper, who though he railed against superstition in others, yet had enough of it himself, as may appear by his story of "the Earl of Essex, his horses, which, being drawne up in a body, many of them lost their shoes upon White Down, in Devonshire, neer Tiverton, because Moonwort grows upon the heaths."

Turner, in his "British Physician," published in the year 1687, says, "that this fern is neither farrier, smith, or picklock," but believes in its medicinal properties, and also that it is the moon's herb."

THE JONES AND FOX COLLECTION IN THE CLIFTON ZOOLOGICAL GARDENS.

Following a flying visit when passing through Bristol, I persuaded our Editor to join me in a week-end at Clifton, in itself a most delightful spot, the romantic scenery from

the Downs along the valley of the Avon being sufficient to repay the journey. Our quest, however, was the Zoological Gardens, best known to British fern lovers as the repository of the extensive collection of British ferns formed by the late Colonel Jones, and many of the varieties raised by Dr. Fox. The gardens have been for many years under the care of Mr. H. Harris, by whom we were received with the greatest courtesy. Twenty-four years ago Mr. Druery had met Mr. Harris when staying at Colonel Jones' house on the occasion of delivering a lecture on "Ferns" to the British Naturalists' Society at Clifton, and it was very gratifying to have been the means of bringing together again two such enthusiastic veterans after the lapse of so many years. The interesting Zoological collection was duly inspected, but our minds inclined to captives of a more peaceful order, and neither tigers' stripes nor leopards' spots could keep us long from matters horticultural.

The gardens contain, amongst many other interesting subjects, a fine collection of hollies, and many specimens of trained trees and shrubs, interspersed with fine clumps of rhododendrons, whilst the terrace walk fronting the New Lion House was gaily decked with beds of Begonias in full splendour skirted by specimen palms, pictures of health, grown in large tubs. The lake, with its grass foreground, picturesque island and back-ground of shrubs, the home of numerous domesticated water-fowl, is a very attractive feature. Mr. Harris's house adjoins the entrance from the Downs, and in a sheltered nook, and right under the master's eye was a bed of grand specimens of many of the Plumose section of *Polystichum angulare*, raised by the late Colonel Jones and Dr. Fox. An *A. f. f. Clarissima* raised by apospory by the Editor from the late Colonel Jones' original plant found by Moule, a curious *Scolopendrium vulgare*, *crispum cornutum*, and many other choice and rare things were noted here.

On leaving this spot we were conducted to the first of

the *Scolopendrium* beds, and here one was constrained to hold one's breath, for rarely has one the opportunity of seeing such a magnificent group of finely-developed plants. *Crispums* as large as bushel baskets were there in endless variety, together with forms of *capitatum*, *grandiceps*, *ramosum*, *sagittatum*, *projectum*, *marginatum*, *muricatum*, and others, amongst which were fine examples of *Sagittato projectum*, one in which the pinnatifid cutting extended almost to the midrib, and another a perfect *revolvens*. This bed led, by a continuation of narrow beds and smaller bays still filled with examples of choice *Scolopendriums*, to the collection of *Polystichums*. Here we found treasures innumerable, mostly consisting of divisions of original finds; one, an original division of *Polystichum aculeatum pulcherrimum* (Beavis), still remained a single crown, which is quite contrary to its normal habit, as it usually produces offsets with great freedom. There were also *P. ang. grandiceps*, *Abbottæ*, *P. ang. Iveryanum* and *flabellipinulum*, in splendid form, and *divisilobe*, *acutilobe*, *tripinnate*, *brachiate*, and other types associated with the names of Dr. Wills, Moly, Clapham, Lowe, Stansfield, Mapplebeck, Jones, Fox and Wollaston, and many others of a past generation of fern hunters; and, lastly, a grand group of that *Plumose* section which will ever be associated with the names of the late Colonel Jones and Dr. Fox. Amongst these were specimens exhibited and certificated at the great Fern Conference held at Chiswick in 1891. This section, the most beautiful of any, is particularly interesting to the writer, as the parent plant, from which it is descended, passed into his possession with Mr. James Moly's collection. One cannot help observing how certain ferns have asserted their potency, transmitting to succeeding generations their roguish tendencies, which it seems impossible to breed out. Amongst the *Polystichums*, Jones' Hampshire *polydactylum* seems to have been the principal offender. It crosses freely with other varieties, usually producing irregular offspring. The next bed contained the collection of *Lastreas*, most

of the plants consisting of gigantic clumps, which have remained undivided for many years. All the best varieties were represented, the "King" of the Male Ferns again and again asserting his regal presence, *Bollandæ* exhibiting its depauperate character in an otherwise beautiful plant. Padley's *depauperata*, in all its robust ugliness, together with *Polydactylas* of Wills and Mapplebeck, *pendens*, *revolvens*, *Pinderii*, *Barnesi*, Wright's *ramosissima*, and many others too numerous to particularise. The last group embraced the *Athyriums*, and whilst the specimens themselves were very fine, the varieties were such as used to delight the hearts of the early collectors and cultivators, none of the improved varieties raised during the last twenty years having been added. The old Axminster *plumosum* was in frequent evidence, while *subplumosum*, crested, cruciate, setigerum, and other forms were plentifully represented. The ease with which varietal forms can be raised, and the lack of severely repressive measures in early days, doubtless accounts for the endless numbers of indifferent crested forms, which in those of the *Craigii* parentage predominate. When at length our stomachs sought a quarrel with our throats, we adjourned for lunch, with the promise of an inspection of the reserve beds and seedlings to follow. After a rest and a brief courtship of "My Lady Nicotine," we resumed our quest and were rewarded by further discoveries. Many seedlings of great promise were noted for future observation, and at length weary in body, and with minds surfeited, we adjourned to our quarters to rest and talk over the day's doings.

The next morning broke dull and showery, but we were tempted to return to the scene of the previous day's exploits, and after another quiet look round and having inspected some of Mr. Harris' dried fronds, we left the gardens to make a call on Miss Jones, daughter of Colonel Jones.

When delivering a lecture on ferns and fern-growing at Clifton in 1885, our Editor had been most hospitably

entertained by the late Colonel Jones. He was anxious now to ascertain the fate of an interesting form of *Pteris aquilina*, the pinnæ tips of which were rolled up into balls and hung like bunches of grapes, and which was then strongly established in the front garden. When unrolled it was found to be thoroughly crested, a more curious than beautiful combination, but particularly interesting as a cross between *P. aq. glomerata* and *P. aq. cristata*. Miss Jones received us most kindly, and amongst other things, explained the process of printing the nature prints, distributed by the late Colonel Jones amongst the members of the old and original Pteridological Society.

Alas for the vanity of earthly things. The *Pteris* had gone the way of many choice things. Miss Jones, however, offered to show us a few of the late Colonel Jones' special favourites, which were growing in the garden of a relative near by. We gladly accepted the invitation, and great was our reward. Amongst the many gems we found specimens of many original finds of Moly, Wills and others, but chief among them, the original *A. f. f. Clarissima*—compared with which those raised by apospory sink into insignificance. With erect fronds five feet long, and fully two feet wide, it presented a most graceful outline, being quite devoid of the twist which appears in the fronds of all its aposporous offspring.

When discovered, the plant possessed two crowns, one of which passed into the possession of the late Mr. Wollaston, by whom it was grown in a cool house, and attained magnificent dimensions. It was from one of the fronds of this that the late Colonel Jones prepared his nature print.

The Clifton collection, whilst probably unrivalled in some respects, contains no examples of *Polypodium vulgare*, *Lastreas montana* and *dilatata*, *Blechnum spicant*, or *Osmunda*, nor did we find *Polypodium dryopteris*, *P. chegopteris*, *Asplenium marinum*, *Asp. adiantum nigrum*, *Asp. trichomanes*, *Pteris aquilina*, *Adiantum capillus veneris*, or *Cystopteris*, amongst

which are some of the most beautiful varieties of British Ferns. The whole collection was, however, in the most robust health, not a "livery" specimen amongst them, and the dimensions to which some of the clumps had attained was indeed a revelation, indicating what can be accomplished by skilful cultivation and suitable environment.

The next day being fine we determined to go on a ramble through the Leigh Woods, in search of varieties, though the country near Clifton is not rich in ferns. On our way we skirted the walls of the gardens, on which we discovered some delightful little crested specimens of *Scolopendrium vulgare* which, however, could not be regarded as wild finds, having in all probability grown from spores escaped from the garden. They were, however, owing to the height of the wall, secured with some difficulty, the writer posing as Atlas and the Editor as the Universe.

In the woods we found *Polypodium vulgare* in plenty on the trunks and stumps of oak trees, but no varieties. Descending to the river side, the face of the cliff was dotted in fair abundance with *Asplenium ruta muraria*, and occasional specimens of *Ceterach officinarum*. A frugal lunch at a wayside inn, a trip upon the electric tram to Brislington, the home of the late Dr. Fox, and a return to our hotel concluded a most enjoyable visit, the fruits of which adorn my fernery, affording bright promise of delights in store.

W. B. CRANFIELD.

SPRING TREATMENT OF HARDY FERNS.

When this issue of the "Gazette" reaches its subscribers it will be the best time of the year for the dividing, repotting and general overhauling of their collections, since after the long winter's rest the plants are in the best condition to withstand such operations with the least detriment. This is partly due also to the fact that the new season's fronds, under quite cold treatment, are still comfortably packed up in the crowns of ferns of the shuttlecock persuasion, while any damage which may result to the old ones of evergreen

species is soon rectified by the appearance of a new batch. It may, however, be remarked in this connection that green fronds should be preserved as far as possible, only dead ones being removed, since such green foliage undoubtedly contributes something to the vigour of growth of their successors. In the open, too, the old frondage, even the dead and shrivelled *debris* of deciduous ferns, forms a natural protection to the crowns, and if removed for tidiness sake should be replaced by a liberal mulching of leaf soil. This is advisable for the reason that the new fronds, as they rise, and even as a preliminary to rising, produce individually little bundles of roots from their bases, which may be seen emerging from and creeping down the sides of the projecting caudices or root-stocks on their way to the soil, and given a spell of March winds, dry and keen, these may well be checked and perhaps destroyed by exposure, which the old *debris* prevents. Under glass, of course, there is less risk of this, but even there this habit of growth should be borne in mind. Treating still of the crown-forming ferns, Lady Ferns, *Lastreas* and *Polystichums*, all these have a tendency to propagate themselves, either by fission of their crowns or by the production of lateral offsets, which in time form bush-like growths in lieu of single crowns. The disadvantageous result of this is two-fold: firstly, the fronds in such case cannot possibly display their full beauty, since they become mixed up and often distorted; and, secondly, owing to the competition for root room they become dwarfed and cannot attain half the size and development of character that a single isolated crown is capable of assuming. Hence, if really fine specimens are desired, plants of more than one crown should now be divided, the best plan being to fork them up bodily, when it will be found that they can be readily coaxed apart, each crown coming away with its independent roots and easily establishing itself anew when replanted. Where, as is generally the case with Lady Ferns, these crowns have been produced, not by offsets, but by splitting of the

crowns in the centre, the subsequent growth producing a sort of Siamese twin connection, a sharp knife may be used to start the separation, until it is found that the crowns yield to pressure and come freely away as in the other cases. In doing this care should be taken not to squeeze the upper parts in which the new fronds are packed, but to confine the pressure to the vicinity of the initial cut. As many of the best varieties of *Polystichum* form bulbils on the fronds near the bases, it is well when removing even the dead fronds to look out for these as a means of propagation, since they retain vitality long after the rest of the frond has perished.

Repotting should not be done unless really necessary. Well-established single crown specimens do well for years together in fair-sized pots or pans, if mulched occasionally with a little fresh soil. We have in our collection a remarkable instance of this. It must be close on thirty years ago we installed a crested Lady Fern in a cork receptacle, formed of a roofing slate, about two feet by one, with a large piece of curved cork, pierced with holes here and there and secured to the slate by copper wire, another smaller piece of curved cork being secured to the bottom to retain the soil. That fern is as robust as ever, though the soil has never been renewed but only replenished by a handful or so of soil every few years. Sundry small ferns have appeared in the holes aforesaid and do equally well. Ferns with travelling root-stocks, like the *Polypodies*, are also best left alone if in good condition. To increase them is easy, any piece of rhizome, with a frond or two and a growing tip, is sure to establish itself. Ferns, on the other hand, which are out of condition should be turned out and repotted, all dead matter being removed, and as small a pot used as will contain them. Let the pots be well drained and a careful look-out be kept for worms and grubs, especially the white curved maggots of the Weevil, which, with Hartstongues in particular, is very destructive, the maggots devouring the roots and crowns during the winter and the beetle the fronds during the growing season.

C. T. D.

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ASPLENIUM TRICHOMANES INCISO-CRISPUM CLEMENTII.

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EDITORIAL NOTE.

In this issue the Editor is again glad to include some contributions from members, though he would be more gratified if these were more numerous in view of the large increase of membership due to the establishment of the "Gazette." He also hopes that now the season is in full swing he may receive fronds or photos of fresh acquisitions either from fern hunters or fern raisers; accompanied by stamps for return postage in case of need. The list of members, with their addresses, given at the end of this issue should be of value, and it is to be hoped will be largely extended by the present members calling the attention of their fern-loving friends to the existence of the Society, and the publication of the "Gazette," a specimen copy of which will be willingly sent to any one likely to join. The annual subscription of 5s., payable either to the

Secretary or the Editor, entitles to membership and four issues of the "Gazette," concerning which all communications should be addressed to the Editor, 11, Shaa Road, Acton, London, W. He also calls special attention to the August meeting, particulars of which are given below.

EDITOR.

THE AUGUST MEETING.

It has been the custom for the members of the British Pteridological Society to hold their Annual Meeting on the August Bank Holiday, at which meeting the Report and Balance-Sheet of the Society are produced, any necessary resolutions passed and the place of the next annual meeting determined. Advantage is also taken of this meeting to display fronds or plants of new fern varieties for judging and naming, and to organize one or more fern-hunting expeditions in the locality in conjunction therewith. Such of the members who can manage to arrive on the Friday at the rendezvous, which will be determined beforehand, will have thus a good opportunity of familiarizing themselves with the ferns of the neighbourhood, and it rarely happens that such expeditions are undertaken without good results in the way of wild finds. For many years the meetings were held at Bo'ness, Windermere, but eventually it was thought desirable that other ferny localities should be visited, especially Devon, where a large number of species was available and in greater abundance, but this idea still remains in abeyance, though a change of scene was effected by a fixture in Ireland, where, however, the attendance was too scanty to encourage further trips in that direction. Last year, therefore, it was determined to hold the meeting next August Bank Holiday at Moffat in Dumfriesshire, as being not only in a district where ferns abound, but also within comparatively easy reach of those resident in English lakeland and Scotland. Our president, Mr. Alexander Cowan, has very kindly visited Moffat and made the necessary enquiries as to accommodation, and we are

happy to state that this can be obtained on satisfactory and economical lines, while a trip of a mile or so will bring the members into the midst of ferns of many species, and in a district which is practically virgin. Fuller particulars will be issued beforehand by the Committee, including the rendezvous aforesaid, but meanwhile it is to be hoped that a good number of members will book the outing as an engagement, and endeavour to reach Moffat on Friday, 29th July, so as to profit by the visit to the utmost. In this way the members have an opportunity of making or improving each others' acquaintance, comparing notes as regards their collections, possibly arranging exchanges to mutual advantage, and all this combined with the chances of fresh discoveries on new and promising ground.

EDITOR.

OUR FRONTISPIECE.

ASPLENIUM TRICHOMANES INCISO-CRISPUM CLEMENTII.

We have much pleasure in reproducing a photograph of this very remarkable form of *Asp. trichomanes*, which differs from and surpasses all the other *incisum* or plumose forms of this species so far found. It is in the possession of Messrs. Bolton Bros. of Warton, near Carnforth, and was found some years ago by Mr. W. Clement in a crevice in an old wall facing the east, and in association with many of the normal type at Vealand Conyers, Carnforth. The photograph, for which and for the loan of the block we are indebted to Messrs. Bolton Bros., shows that the pinnae are not merely much expanded and deeply cut as with other *incisums* but are prettily crisped and set on to the midrib much more densely, constituting an absolutely unique form of the species. When found it was a tiny plant with $1\frac{1}{2}$ inch fronds, but has now fronds of nearly a foot in length, but entirely barren, indicating its true plumose character.

PLUMOSE VARIATION IN FERNS.*

As the plumose or extra feathery varieties of Ferns are universally recognised as the most beautiful, since being purely extensions of normal growth, they are not open to the objection sometimes raised that other forms of variation are "monstrous," a little consideration of their nature may not be out of place. As a typical form we may take the so-called Welsh Polypody (*Polypodium vulgare cambricum*), a very old variety. The normal frond of the species consists of a stalk flanked on either side by a series of smooth-edged somewhat blunt-ended lobes, about one-third inch wide, and on robust plants one and a-half inches long, the stalk forming roughly one-third of the frond length. At the back of these lobes there are bright yellow spore heaps, round, and of exceptionally large size, and the spores themselves are yellow, and also much larger than those of most ferns. In the Welsh Polypody, however, we find a very different formation, the normal smooth-edged narrow lobes or pinnæ are transformed into deeply cut wide ones with long pointed segments, an inch long or more, set closely together, with the result that these pinnæ overlap, and as they are also longer than the normal the frond is very much wider and, indeed, has no resemblance at all to the normal species, even the texture being thin and papery. Another difference is that spores never appear, the fronds are invariably barren and it is this feature, conjoined with the extra foliose character, which distinguishes the true plumosums of all species. It would appear that it is this absence of spore producing capacity which determines the extra leafy development, for if we examine the veins of *P. vulgare* normal we find that a certain number of them, starting from the midrib, stop abruptly half-way across, and at this point serve to form and feed a spore heap, and this, like all reproductive action, concentrates in itself a large amount of vital energy. In *P. v. cambricum* most of the veins continue, and the few of them which stop half way produce no sorus but

* By permission of the *Gardeners' Magazine*.

merely determine a deeper cut, and hence not only are no spores produced, but the energy, which their production would have absorbed, is free to be devoted to forming and feeding a leafier development. A proof that this is, so to speak, the *modus operandi* is seen in the plumose or crispum Hartstongues. The true thoroughbred crispum is as barren as *P. v. cambricum*, and as a result forms a deeply and regularly frilled frond, but there are some crispums termed fertile ones, in which irregular patches of spores are produced, and it invariably happens that where the spores appear on the frond back, the development of the frill is affected, and the edges, instead of being regular, are irregular and crenate. The veins in short cannot perform both functions completely, and the one must be at the expense of the other. As compared with the cristate variations, the plumose ones, especially the true plumosums, *i.e.* perfectly barren ones, are very rare. In the Polypodium family, besides *P. v. cambricum*, of which, by the way, there are several distinct forms besides the old one, viz. *Barrowi*, *Hadwinii*, and last, but not best, *Prestonii*, we have *Phlebodium* (*Polypodium*) *aureum Mayii*, which originated in Mr. H. B. May's Nursery at Edmonton, and *P. (?) Knightii*, an exact reproduction of the Cambricum form in a very large growing exotic species, unfortunately not specified in the name given.

In the Lastreas we have several plumose forms of *L. montana*, but none of the other species except *L. f. m. Bollandae*, an imperfect form. In the Asplenium family we have *A. trichomanes incisum*, found several times, perfectly barren and imitating *P. v. cambricum* as much as a small growing Spleenwort can. In the Nephrolepis we have *N. rufescens tripinnatifida*, another sport on the same lines of extra leafiness and barrenness. That magnificent Maidenhair *Ad. Farleyense* is a thoroughbred plumose form of *Ad. scutum*, as we once saw a specimen shewing reversion to that species in several fronds. Taking perfect barrenness as a feature, these are all the true

plumosums we can call to mind, but outside these there is a considerable number of plumose forms so called from their beautiful feathery character, which is, however, due rather to abnormal subdivision than to actual extra leafiness, and upon these varieties spores are engendered, in some cases rarely and in others constantly, though never in the same abundance as with the normal forms. Thus in the wonderful range of plumose *Polystichums*, several have been reputed barren but erroneously, since instead of easily visible spore heaps, a careful examination with a strong lens has disclosed the existence of solitary sporangia or spore pods. It is thus with *P. ang. pl. Pateyii* and that beautiful form of *P. aculeatum* known as *P. ac. pulcherrimum*. In this connection there is no doubt that abnormal seasonal conditions may induce fertility only at rare intervals, and thus confirm a wrong impression as to complete infertility.

All the plumose *Athyria* known to us bear spores, and in view of the principle above enunciated that extra leafiness is at the expense of the fruit, a familiar axiom with fruit growers proper, it is a peculiar fact that some of the most plumose *Athyria* not only bear spores, it is true, in a somewhat imperfect way as regards the sorus formation, but also produce numerous bulbils associated with them. It is, however, conceivable that bulbils, despite their larger size, do not tax the vital vigour of the plant so heavily as spore heaps proper, and are the result of a check in the production of such, and a transmutation of the diverted energy. The superficial area of a plumose frond of this description is also much greater than that of a normal frond, and this naturally means extra chlorophyllic action, which may serve as an additional vegetative stimulus. None of the perfectly barren plumosums bear crests or terminal tassels, but there are numerous examples of tasselled plumosums of the partially fertile kind, and it has been found that uncrested wild finds of this type have yielded finely crested progeny from their spores under conditions which preclude the idea of crossing with crested forms. The study of the

veins of plumose varieties leads to the conclusion that a free venation is a *sine quâ non*, since the extra foliose character peculiar to the section is entirely due to the lengthening of free veins beyond normal limits, carrying as it were tissues with them. A reticulate or netted venation with anastomosing veins could hardly permit of similar extension. As regards the origin of plumose varieties we are entirely in the dark. *Phlebodium aureum Mayii* originated, as we have said, under culture, and indubitably from a chance spore derived from a normal plant; the others named were all, we believe, found wild, but must, it is obvious, have originated in the same way, *i.e.* from a spore from a normal plant, which was either subtly affected when it was shed, or produced a prothallus, whereon the formative or reproductive cells were affected in such a way that the resulting fern was barren and foliose by correlation. It is recorded with regard to *Scol. v. crispum*, the plumose Hartstongue, that Col. Jones found no less than twenty-nine separate specimens in one locality, and most of them in one lane in S. Wales, and this would tend to prove that the spores of an otherwise normal plant in the vicinity were affected as above, as it is obvious that all were otherwise independent sports.

C. T. D.

CYSTOPTERIS FRAGILIS SEMPERVIRENS.

In Mr. E. J. Lowe's "Our Native Ferns" this fern is mentioned as follows: "Said to have been found at Tunbridge Wells and in Devonshire. A native of Madeira, and perhaps a distinct species. Some obscurity hangs over it as a British plant." In 1906, however, I received fronds from a plant which was found wild in Scotland, in Corrie Clanmor, by Mr. William Young, of Kirkcaldy, and as these fronds had been gathered in a green and healthy condition in the winter from a quite cold frame, in which the ordinary *C. fragilis* had died

down months before, I felt immediately convinced that *C. f. sempervirens* was thus established as a British plant, and obtaining Mr. Young's permission, through the late Mr. R. Somerville, who had sent me the fronds, I scattered the spores freely inside a Wardian case. The result was a considerable number of plants, all of which have proved their distinctness, winter after winter, by remaining not only perfectly evergreen, but practically growing all the year through. It is a robust grower, but not otherwise dissimilar to *C. fragilis* in make. So far, its fronds do not turn brown, as those of *C. fragilis* are apt to do. It was found apparently some few years prior to my acquaintance with it, and it is only recently that I came across the late Mr. Somerville's letter, which has induced me to put the matter thus on record in the "Gazette."

C. T. D.

RAISING LASTREA MONTANA FROM SPORES.

As *Lastrea montana*, or to give it its English names of Mountain Buckler Fern or Lemon Scented Fern, grows in considerable quantity and in great luxuriance in this neighbourhood, and as I find I can grow it equally easily and well in my garden, it has always been one of my favourites among British ferns, and as I have been successful in raising large numbers of seedlings, I have great pleasure in complying with the request of the Editor to give a short account of my method, in case any members who have the means of growing this beautiful fern care to try to raise seedlings of it. To begin with, I always select soil either from a place where *Lastrea montanas* are growing, or else use pure loam, which I know to be free of lime, and which, it is well known, this species dislikes, and I boil sufficient soil in an old pan to fill a number of pots; this I find much less trouble and more efficacious than to first fill the pots with soil and then pour boiling water through them. For pots I use any old glazed dishes, such as cups

without handles or any similar receptacle, in which a small hole must be made for drainage and to allow of watering from beneath; some of my most successful sowings have been made in discarded bell-shaped glass gas shades. The pot, after being crocked, I fill with soil to within an inch of the top, and after sowing the spores place it in a saucer of water, and put a piece of glass on the top of it in the usual way.

I have tried sowings of *montanas* both in a warm greenhouse and in a cold one, and I find them to grow well in both; if anything, I think they come quicker in heat, but a cold greenhouse, or frame, or even a cool room is quite sufficient. The prothalli seem to dislike excessive heat unless they are kept sufficiently damp; on the other hand, I have seen them damp off in a curious manner, showing that too much moisture is also injurious. As the prothalli are much smaller than those of most other species, care must be taken at this stage to remove any larger-sized prothalli which may appear, as these probably come from chance spores of *Lastrea dilatata* or *Athyrium f. f.* or other stronger growing varieties, which, if they are present in quantity, would choke out the *montana* owing to their more rapid growth. In the case of some pots in which I have not taken this precaution I have had no *montanas* at all, but a plentiful crop of numerous other varieties which I did not sow intentionally.

As soon as the seedlings are about an inch in height I prick them out into pans or small wooden boxes filled with a mixture of loam, peat, leaf-mould and sand in about equal proportions which has been passed through a $\frac{1}{4}$ -in. mesh riddle and is then well pressed down and watered. These seedlings should be kept in a fairly close atmosphere, otherwise they must be covered with sheets of glass until the seedlings have taken root, and they must always be watered with a fine rose with rain water or water free from lime. I find they grow very quickly in a warm greenhouse, and it is most interesting to watch their development,

especially those from mixed spores, as some varieties show their characteristic features when barely an inch in height, notably so, seedlings from Smithies *grandiceps* found in Kendale, which show their *grandiceps* breeding or character in the very first fronds they throw up; seedlings from *congesta* are also easily recognisable. When the seedlings have been grown a year or two in boxes, I plant them out in cold frames into similar but rougher soil. My first lot of seedlings planted out in this way a year ago being now some of them a foot or more in height, and those worth keeping will be planted out in the open in the course of this summer.

This Fern grows, as I have already said, vigorously in cultivation, the soil in different parts of my garden appearing to suit it quite well, the principal requisite for its successful cultivation being absence of lime and a situation in full day-light, *i.e.* without overhanging branches of any kind but sheltered from strong winds and with sufficient moisture at its roots. It can stand full exposure to sun but seems impatient of drought. In its native habitat, the caudex and roots of healthy specimens are invariably kept cool and moist and sheltered from the sun's rays by either a thick covering of mosses and grasses or even common ling.

I venture to think that no lover of ferns who has had the pleasure of seeing the unique collection of varietal forms of *Lastrea montana* growing in the garden of Mr. George Whitwell, the Secretary of the Society at Kendal, or even a bank of several hundred strongly-grown plants on a hill-side, can fail to admire the extreme beauty either of its habit or colour. Unfortunately, owing either to its cultivation not being properly understood or for other reasons, very few varieties of it are in commerce, its cultivation being confined to a few enthusiastic amateurs, and I can only hope that these few hints may be the means of inciting members of this Society to try their skilled or unskilled hands, as the case may be, at raising seedlings.

If there be any and they have no means of obtaining spores otherwise, I shall be most happy to send mixed spores from say a dozen distinct varieties to any member who cares to send me during the summer a stamped addressed envelope.

Valleyfield, Penicuik.

ALEX. COWAN.

That *Lastrea montana* is equally amenable to ordinary garden culture is evidenced by the fact that I have several very fine varieties in my garden at Acton, Middlesex, and that they established themselves with ease and have grown robustly in somewhat sunny positions for several years. The soil is a good yellow friable loam and gravel, and except when there has been a specially long period of drought, no watering has been needed. *Apropos* of spore sowing of this species, the late Mr. Barnes was very successful and attributed this partly to the fact that he always sowed his spores on sloping soil. EDITOR.

SEED BEARERS AND SPORE BEARERS.

The Plant world is divided into two great and distinct classes, viz. those which propagate themselves by seeds and those which produce spores for that purpose. To the former class belong all flowering plants, for it is the primary object of the flowers to act as adjuncts to the seed vessels and, as a rule, attract the insect world, which aids so materially in the fertilization of the seeds by the conveyance of the pollen from one flower to another. There are, however, many flowering plants which are independent of this aid, but in all these we find the decorative part of the flower to be reduced to a minimum, and it is only those essential parts, the stigmas and stamens, which are mainly in evidence. The spore-bearing plants embrace all the seaweeds, fresh water algae and microscopic vegetable life, the Lichens and Marchantias which clothe our rocks with encrusted verdure, the mosses, the Ferns and Equisetums.

and their allies, and last, but by no means least, the immense family of the Fungi or Mushroom tribe. The study of evolutionary science has taught us that despite the fairly distinct line drawn between seed-bearers and spore-bearers, there is no doubt that in the far distant past the former were evolved from the latter and certain links between the two still survive. Thus, in the Maidenhair tree (*Salisburia adiantifolia*), a true flowering tree, indistinguishable at a distance from full-sized ordinary trees, we find leaves perfectly constructed on the lines of the Maidenhair Fern, and it has furthermore been demonstrated by Japanese botanists that the fertilization of its seed is effected in a sort of half-way fashion between that of Ferns and flowering plants.

The Cycads (*Cycas revoluta*, etc.), like leathery-fronded Ferns, form another link in the same way, and in many of our Conifers or Fir trees, the strong resemblance to the Selaginella tribe in the formation of their foliage, indicates a further affinity of origin. Before proceeding to consider another link of importance in this connection, we must explain the difference between the processes of reproduction through the spore and through the seed. Seeds as we know vary greatly in size, from extremely small ones like those of the Poppy or Lobelia up to huge ones, as big as a man's head, in the Cocoa Nuts. One and all, however, agree in consisting of a shell, containing a mass of nutriment in the shape of one or two condensed leaves called cotyledons and a germinal point consisting of a rudimentary root and centre of growth. At this point lies the vital centre of the future plant formed by the union of the two parental influences originally contained, one in a cell of the embryo seed of the mother plant and one in the pollen grain which fertilized this seed, and without which the seed would have perished but with which it grew and developed into a perfect seed, as above described. If now we place this seed in the soil under congenial conditions it will in due course absorb moisture and swell, and the vital

centre aforesaid being excited into activity the husk will be burst, the root grow and protrude and presently the one or two cotyledons will emerge and the young plant start existence. A spore, on the other hand, is not the result of a previous fertilization, it is a mere microscopic cell enclosed in a husk without any provision of nutriment in the shape of embryo leaves or any definite centre of vitality beyond that of the nucleus common to all living cells. Such a spore falling on a congenial spot swells and bursts its husk in the same way as a seed, but in the case of the fungi, instead of producing a fungus like that from which it was shed, it merely multiplies itself, the resulting cells absorbing nutriment from the material they rest upon and forming a rambling network called the *mycelium*, from which eventually spring spore-bearing fungi once again. This, at any rate, is the process with such fungi as the Mushroom, of which the so-called "spawn" is simply soil pervaded with the mycelium network described. The fungus family, however, presents so many variants of this process that we can merely cite one particular type to demonstrate the principle involved. In the Fern spore, however, we reach a higher plane of development, the true nature of which was only grasped about sixty years ago, and when grasped it was seen that it formed a distinct evolutionary link, since before the young fern appeared, not only was a seed formed but this seed exactly resembled the seeds of recognized flowering plants by being the result of fertilization though two distinct organs which were to all intents and purposes male and female flowers. In Ferns, the spore, instead of producing a wide-spreading network or mycelium like the Mushroom, builds up a tiny green heart-shaped scale attached to the soil by root-hairs, and on the under side of this embryo seeds are formed and also a number of little sacs, which burst and throw out motile bodies, the exact equivalent of pollen grains, which find their way to the seed or seeds and fertilize them, upon which they act precisely as flower seeds by producing a

young plant. Here then we clearly see the important link above alluded to, though the gap is still a wide one between an animated pollen grain (antherozoid), which reaches its goal by swimming a fraction of an inch, and an inanimate one which has to be transported by bee or breeze to another flower at a distance or even only from the stamen of one flower to the embryo seed comparatively far away at the base of its stigma. This gap is, however, partly bridged in the *Salisburia* already cited, for in it the pollen grain carries the paternal influence only part of the way to the embryo seed and then the journey is completed by a moving antherozoid of the Fern type.

C. T. D.

THE LATE MR. JAMES MOLY.

We extremely regret to have to announce the death of Mr. James Moly in his 85th year, on April 15th last, at his residence, Langmoor Manor, Charmouth. Mr. Moly was one of the few remaining pioneers of the British Fern cult, and stood alone as the discoverer in Dorset, Devon, and adjacent counties of no less than about 600 distinct varieties of our Native Ferns, a considerable number of which were high-class and some absolutely unique. For many years he lived the life of a recluse in his mansion, surrounded by extensive grounds, in which his acquisitions and those of others were grown under the great advantage of a congenial western climate and experienced culture, and it is a fortunate circumstance that although his advanced age prevented his collection from being properly looked after in recent years, it was acquired prior to his death by our member, Mr. W. B. Cranfield, the great majority of forms being thus saved, instead of, as is so frequently the case, generally distributed and the identity and consequent great interest of such a collection entirely lost. Many of the plants were so old as to have almost entirely lost their vitality, but under Mr. Cranfield's care and skilful surgical treatment they have

not only been resuscitated, but in many instances increased considerably in number by the operation. For many years Mr. Moly was closely associated with the late Dr. Wills, his neighbour and fellow-collector, who also found a large number of beautiful forms; and it was, thanks to the latter that the writer made Mr. Moly's acquaintance many years ago and found, despite his then neophyte stage, such a hearty welcome after a few testing questions, that his introducer, on his departure with sundry precious acquisitions, could not refrain from expressing his surprise as well as his pleasure, so true is it that "a fellow hobby makes us wondrous kind." By Mr. Moly's death a very handsome bequest falls to the ancient borough of Lyme Regis, to which, apart from a generous gift to the Axminster Cottage Hospital, he left Langmoor Manor and the residue of his estate "to promote the educational well-being of the inhabitants, such subjects as drawing, painting and modelling to be specially encouraged."

C. T. D.

APOSPORY.

Although as far as possible I* desire in this "Gazette" to avoid such matter as only the scientific botanist can fully grasp, the discovery of Apospory in Ferns presents so peculiar an instance of an ordinary amateur student being able to contribute a material item to scientific knowledge, that I may perhaps be pardoned for describing what it is. Shortly stated, it is the direct production upon the fern frond of that little green scale, or prothallus, which normally is only produced by the agency of the spore, and forms the preliminary growth upon which bodies analogous to pollen grains and ovaries are generated, the young fern resulting from their coalition. The steps which led up to the discovery are in themselves interesting.

*For clearness sake the writer is compelled to use the first person, singular, in this article, as a record of his own personal experiences.

In the early eighties, in one of my sowings of Lady Fern spores, two young plants, when less than an inch high, produced bulbils on the young fronds, a very rare occurrence, especially in that species. Eventually, strangely enough, the two resulting plants turned out to belong to two quite different strains. This instance of precocious proliferation was put on record in the Horticultural Press, with illustrations on a magnified scale, and as a result other instances of proliferation were sent to me, and dorsal bulbils were noted by me in *A. f.f. plumosum divaricatum*. In this way a sort of reputation in the bulbil line was gained, which eventually led to two very unexpected results, since a pinna of *A. f.f. plumosum elegans*, bearing bulbils was sent to me, and the associated spores in that identical pinna yielded that marvellously beautiful strain of crested and non-crested plumosums known as the Druery "superbums," and the other result was the receipt of a similar portion of *A. f.f. Clarissima Jones*, also bearing apparent bulbils. On comparing these, however, with the others which had come under my notice, I came at once to the conclusion that their nature was entirely different, and that they were due to some sort of transformation of spore-producing energy instead of simple proliferation. On layering these and keeping them close, instead of developing whitish pimple-like growths, which then produced tiny fronds in ordinary bulbil fashion, they swelled and threw out transparent root-hairs in all directions and then gradually produced indented flattened tips, which finally became true prothalli, these prothalli then producing young typical ferns in the usual sexual manner.

I gave an account of this to the Linnean Society, but as I could only shew results and not the stages which led up to them, and as the phenomenon was entirely new and unrecorded in any previous connection, it was suggested that I should make a fresh experiment and report again. I did so after obtaining same results, and on the strength of this Professor F. O. Bower took up the matter for deeper

investigation, and eventually confirmed the discovery entirely. On examination he found that the spore heaps commenced to form, but at a certain stage aborted, the stalks of the spore capsules then producing prothalli, the spore itself being entirely eliminated. Immediately on this Mr. G. B. Wollaston put forward a form of soft Shield Fern (*P. angulare pulcherrimum* Padley), in which the extreme tips of the frond divisions grew out into prothalli, thus cutting out even the spore heaps or any association with it. I next noted the same thing in *P. ang. pulch.* Wills, a similar but quite separate find. Next, a tiny seedling of *Lastrea pseudo mas. cristata*, in a Wardian case, was seen to bear a prothallus at the frond top, and eventually broke out into a rash of them all over the surface, an affection, however, which it threw off entirely as it grew up. It appears, however, to be in the blood of the family, since later on Dr. F. W. Stansfield discovered apospory in another member of it, and presumably a direct spore sport from *L. p. m. cristata* itself, *L. p. m. percristata apospora*, a little gem of cristation, every point of which will develop into prothalli if layered, and these prothalli in their turn produce young ferns by apogamy, so that the two phenomena are here combined, the result being the very speedy production of plants, owing to the saving of the time necessary for the production of the antheridia and archegonia and the subsequent fertilization. *Polypodium vulgare* has afforded an instance in a seedling raised by me from *P. v. serratum*, but only in its juvenile stage.

The Hartstongue was my next discovery, *S. v. crispum Drummondiae* tempting me by the transparency of its fringes to layer them, with the result that they produced prothalli and plants freely by apospory. Then at two meetings of the B.P.S. *A. f.f. Clarissima* forms were shown of quite independent origin from that of Col. Jones, but similarly gifted; one, *A. f.f. Clarissima Bolton*, a wild find, the other *A. f.f. Clarissima cristatum Garnett*, raised from an unknown parent. Both these attracted my attention, first of all by

the remark of the finder and raiser that "the spores would not ripen," the whitish aposporous growths instantly giving me the reason. Both these have yielded plants, but Bolton's form is very inconstant, and Garnett's, though itself a very pretty slender cristatum, yields inferior progeny. The aposporous Shield Ferns produce extremely depauperate and defective progeny from their aposporous prothalli, exceptions being very rare, and only so far as I know, in one instance, with Moly's beautifully variegated *pulcherrimum* in Dr. Stansfield's hands.

The moral of the above to young fern students is that close and keen observation may be well repaid, even by "something new under the sun," and that if anything fresh be noted, a record should not merely be kept, but if possible published, and it is only by doing so that fresh material is likely to be sent and fresh discovery thus facilitated. Possibly this description of apospory may lead to further discoveries, and I need hardly say that I should be most happy to pronounce upon any material sent me in that connection.

In conclusion, I may add that *A. f.f. Clarissima Jones* was found by Mr. Moule on a blazing hot summer day, and was observed by Col. Jones, who fortunately visited him in the afternoon, rapidly shrivelling in the sun, and so far gone that it was with difficulty revived and established. Although it assumed in time a very large size, Mr. G. B. Wollaston recorded the width of its fronds as twenty-six inches, it resisted all attempts at propagation by the presumed spores, which appeared in profusion every season, and at the time of the discovery of the true nature of the excrescences only two divisions existed, one in Col. Jones's possession the other in Mr. Wollaston's. On Mr. Wollaston's death the plant disappeared, and it is not known into whose possession it fell, or if it died of neglect. The other division, however, at Clifton, multiplied itself under the tender care of Col. Jones's relatives there into three fine specimens, and from these it was clear that a

peculiar tendency to twist in the fronds, which detracts from the beauty of all the many specimens now extant, which were raised by apospory at the time of the discovery, was not inherited, since the original plant is not only more robust and much larger, but has the fronds perfectly flat. Thanks to Miss Jones's kindness and recognition of my peculiar association with this charming fern, I am now the fortunate owner of one of the divisions, which at the present moment promises to be a full-sized specimen this season. It is a curious fact that the growths observed at the time of the discovery were far larger and very different in form to any subsequently noted, those of the following season being so altered, indeed, that it seemed doubtful whether they would act in the same way. Fortunately, however, they too produced plants, and thus enabled a confirmation of my original report to be effected by Professor Bower. It remains to be seen whether the original type will recur, now that the original plant is under my own observation.

C. T. D.

THE DECORATIVE VALUE OF OUR NATIVE FERNS.—II.*

If we turn from the natural haunts of ferns, and consider them in connection with our own gardens, we shall at once perceive how readily they can be made to decorate places where little else will grow. There are few houses, great or small, whose grounds do not contain nooks and corners where the sun's rays seldom come. If there are also walls and shrubs so arranged as to supply shelter from rough winds, such spots are ideal for ferns. The absence of sun ensures sufficient moisture; the one thing needful is to make any necessary provision for drainage. Our experience of the decorative methods which ferns adopt when

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left to themselves will be fertile in suggestions for the treatment of such sites. Where there are walls, little difficulty will be experienced in inducing the Polypody to adorn the tops, leaf-mould worked into hollows and crevices is all they will need. To get the sites covered with Hartstongues, after the fashion of the wall described in the *Guardian* of January 10th, will not be so easy; the requisite supplies of moisture will be absent. But, with the help of stones and cement simple wall-pockets can be readily made, in which the ferns will soon be quite at home. If there are no walls, as a supplement to the walls, tree stumps and roots afford, perhaps, the best of all positions for the Polypody. It was with some hesitation that I ventured to imitate Nature, and grow my best varieties in this way. The results have so far surpassed those obtained upon the level that I can confidently recommend the method. Its feasibility arises from the indifference of the Polypody to temporary drought. In the neighbourhood of Dublin, the summer of 1905 was one of the driest for years. Many of my Polypodies received no artificial watering. They are, nevertheless, in full health and vigour. The rest of the work will be best completed by throwing the soil into hills and hollows, to which stones may or may not be added, according as taste or convenience direct. In this way not only will drainage be simplified, but the variety of contour inseparable from Nature's ferneries will be obtained. By simple devices such as these we shall be able to associate all the more hardy ferns, and to give them the situations they like best. Upon the lowest levels will be the Lady Fern and the Broad Buckler, higher up the Shield Fern and Male Fern will make their home. Over them the Polypodies will wreath the tree-stumps with coronals and garlands of richest green. Behind, where there are walls, the distinct form of the Hartstongue will give a fitting background. The Polypodies, again, a forest of them if we are happy in our planting, will add the topmost finish to the whole.

The first of the qualities which make our ferns so valuable for decoration will now be manifest, in that they supply suitable means for treating those dark and damp places where little else can live. It remains to show that the pronounced beauty of form which the ferns possess, entitles them to the decorator's fullest consideration. In what has been written thus far we have been occupied, almost exclusively, with normal forms. Such massing as Nature gives is accomplished with ordinary types. But it is the privilege of the cultivator to be able to get together in numbers the special treasures which in the wild state occurs only at distant intervals. Very beautiful and highly decorative are the simplest of our British ferns, as those will allow who have seen them in havens such as we have been describing. They are, however, to be compared with the glory of their fully-developed varieties only as the wild rose to the majesty of its stately cousin when transformed into the queen of flowers. It is no light undertaking to attempt advice with reference to the choice of "varieties." Their multitude is bewildering. I had been some years at work upon the ferns, when the catalogue of a well-known specialist came my way. Most of the types I had studied where they grew, and I had acquired some of the leading varieties. But when I turned over the pages of the catalogue and found, not as I expected, tens, but hundreds, I realised myself the veriest tyro. Of Hartstongues there were seventy-five, of Shield Ferns no fewer than 185, and, what is more, as I have learned since, there are numbers which these lists did not include. Where the field is so vast all that can be attempted is an outline notice of a few that seem to stand out prominently for decorative beauty and for general hardiness.

H. KINGSMILL MOORE.

(To be continued.)

THE BOOK OF BRITISH FERNS.

Those members who have not yet acquired a copy of this standard work issued by the Society, and compiled by the Editor, should certainly do so. It is profusely illustrated, and contains description of about 700 of the choicest forms, as determined by a committee of the Society, and is obtainable from the Secretary, price 3s. 9d., post free.

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British Fern Gazette.

PUBLISHED QUARTERLY.

September, 1910.

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CHARLES T. DRUERY, V.M.H., F.L.S.

PUBLISHED BY

THE BRITISH PTERIDOLOGICAL SOCIETY

(Hon. Secretary, C. T. Druery, 11, Shaa Rd., Acton, London, W.)

KENDAL, WESTMORELAND.



LADY FERNS (see page 103).

THE BRITISH FERN GAZETTE.

VOL. I.

SEPTEMBER, 1910.

No. 5.

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EDITORIAL NOTE.

In commencing the second annual series of the *Gazette* the Editor is delighted to be able to announce that the first has met with great general commendation, and that its issue has resulted in a very large addition to the membership of the British Pteridological Society, for the benefit of whose members it is published. It is gratifying, too, to know that not merely in Britain has it been recognized as forming a valuable and indeed unique contribution to the literature of our Native Ferns, but that the general principles of Fern life, variation and culture have been so set forth as to evoke also the interest of colonial and foreign fern lovers and scientists, a number of whom have consequently become members. The Editor, however, regrets that he is still compelled to figure so largely as a contributor to its pages, and desires particularly that those interested in the cult will aid him by notes and articles dealing in a practical manner with new finds or raisings, and their personal

experiences as hunters, raisers and cultivators. The articles by the Rev. Kingsmill Moore particularly have been of service, as have those contributors who have supplied descriptive lists of their discoveries. These may be taken as models of the matter of chief interest.

As this number commences a second series, the Editor trusts that those who have so far supported him by their subscriptions will continue not only to do so, but to enlist their fern-loving friends as members in addition.

As will be seen from the following report of the meeting at Moffat, N.B., on August 1st, which was attended by a considerably increased number of members, the Editor has also undertaken the duties of Honorary Secretary to the Society, while Mr. W. B. Cranfield, of East Lodge, Enfield Chase, has very kindly consented to act as Treasurer, and subscriptions, *which are now due*, can consequently be sent either to the Hon. Secretary, 11, Shaa Road, Acton, London, W., or to the Treasurer at the address given. By virtue of these new arrangements, necessitated by the regretted resignation of both Mr. G. Whitwell, of Kendal, the Hon. Secretary there since the inception of the Society, and Mr. W. Wilson, the Treasurer, also of Kendal, whose engagements prevented him from undertaking the increased work involved in the now rapid development of the Society, the management of the Society is largely simplified, and it is to be hoped that all lovers of our Native Ferns, and especially of their beautiful varieties, will support it in view of its practical value as a means of bringing them into closer touch with each other. The *British Fern Gazette*, too, is valuable as a means of imparting a mass of information in a concrete form, which prior to its establishment was either scattered through the general horticultural Press, or entirely lost through lack of a recognized channel for intercommunication. In this connection the Editor cordially invites co-operation as above stated, and thinks it well to mention that the four back numbers of the *Gazette* can be supplied to new members for 2s. the set, or 6d. each, post free.

It may also interest the new members to know that the following reports and records of interesting papers read at the Society's past meetings are available, and can be supplied at 6d. each number, post free; or 4s. the complete set of 11. These would make an instructive volume.

1894 and 1895. "Selective Culture." By C. T. Drury,
V.M.H., F.L.S.

"Some Results of Fern-Hunting in Ireland." By
W. H. Phillips.

"Notes on some Irish Finds." By R. Lloyd
Praeger, B.E., B.A.

"Fern Reproduction." By C. T. Drury.

1896. "The Marvellous Side of Fern Life." By C. T.
Drury.

"Weissmann's Theory of Heredity and its Relation
to Fern Life." By Dr. F. W. Stansfield.

1897. "The Ferns of the Diamond Jubilee." By C. T.
Drury.

"Fifty Years' Varietal Development in British Ferns."
By Dr. F. W. Stansfield.

1898. "Ferns as Pet Plants." By C. T. Drury.

"Fern Growing in the Towns." By W. H. Atkinson.
"*Polystichum angulare proliferum*—Past, Present and
Future." By W. H. Phillips.

1899. "Own Finds and Specialities of British Ferns." By
C. T. Drury.

"*Lastrea filix mas*, its Past and Present Divisions."
By W. H. Phillips.

1900. "The Growth of a Hobby." By C. T. Drury.

"My own Finds of British Fern Varieties in the
Lake District." By G. Whitwell.

1901. "The Culture of some Difficult British Ferns." By
Dr. F. W. Stansfield.

"*Scolopendrium vulgare*, its Varieties and Culture." By
C. B. Green.

1902. "The Lady Fern" (*Athyrium filix fœmina*). By
C. T. Drury.

"A List of Finds by Various Members."

1903. "The Study of the Abnormal." By Dr. F. W. Stansfield.
 "Varietal Types of British Ferns." By C. T. Druery.
 "The Propagation of Varieties of *Lastrea montana*." By C. T. Druery.
1904. "The British *Polypodies*." By C. T. Druery.
1905. "Some Personal Reminiscences during Fifty Years of Fern Hunting and Cultivation." By W. H. Phillips.
 "Correlation of Characters in British Fern Varieties." By Dr. F. W. Stansfield.
- 11, Shaa Road, Acton, THE EDITOR.
 London, W.

THE AUGUST MEETING.

On August the 1st, as customary on the August Bank Holiday, this Society held its Annual Meeting, this time at Moffat, in Dumfriesshire, as affording a good field for fern hunting before and after the actual business meeting, which was conducted at Beattock Junction for the convenience of some of the members. The report of the Society was of a particularly satisfactory nature, the establishment of the *British Fern Gazette* in conjunction therewith having resulted in the addition of about one hundred new members, and the placing of the Society upon a far more substantial and far-reaching basis than before. Despite the expense incurred by the tentative issue of the first four quarterly numbers, the balance sheet showed an increase of the funds in hand, evidencing the complete success of the experiment, which it was resolved should become a permanent institution, Mr. Chas. T. Druery, V.M.H., F.L.S., having consented not only to continue the editorship, but also, owing to the much regretted resignation of Mr. G. Whitwell, the Honorary Secretary since the inception of the Society, to undertake the secretarial duties as well. A very

cordial vote of thanks was passed to Mr. Whitwell for his valuable services in the past. The Treasurer, Mr. Wilson, being also precluded by his engagements from continuing to hold the office now that the work had so much increased, Mr. W. B. Cranfield very kindly consented to take that office over, especially as this involved a great saving of work, owing to his proximity in London to the new Secretary, Mr. Druery. The rest of the business was more or less formal, and terminated, after the re-election of Mr. Alex. Cowan as President (and Chairman on that occasion), in a hearty vote of thanks to him for his services in that connection, and particularly for the great trouble he had taken in making the needful arrangements at Moffat for the accommodation of the members. As usual on such occasions, fern hunting parties were organized for the exploration of the district, but as the weather was very fickle, heavy downpours of rain, chilly gales, and general moist conditions handicapping research materially, no very marked "finds" turned up, though a number of augustate and crispate forms of *Lastrea montana*, the prevalent species, were discovered of sufficient merit to be taken for growing on and testing, prior to which it was hardly deemed safe to definitely name them. By an unanimous vote, it was determined to hold the 1911 meeting at Barnstaple, in Devonshire, in order to afford the many members in the Midlands and the North, where the species are relatively much less numerous, an opportunity of studying the more abundant and more varied fern flora of the South of England, and also an improved opportunity to South of England members to be present, an arrangement of which the somewhat restricted and local nature of the Society hitherto has prevented the enjoyment. In view of the now established position of the *British Fern Gazette* as an organ for the dissemination of a wider knowledge of our beautiful fern varieties, and for bringing our Native Fern lovers into closer touch with each other, it is to be hoped that many such

will swell the existing membership, the subscription to which, including four quarterly issues of the *Gazette*, is five shillings only. The Secretary, Mr. C. T. Druery, 11, Shaa Road, Acton, London, W., will be happy to forward all particulars and a specimen number to intending subscribers on receipt of a post-card.

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Together with the President and Vice-Presidents as members *ex officio*.

OUR FRONTISPIECE.

We have chosen for our frontispiece for this issue an illustration of a very choice selection of varieties of Lady Ferns, to which the following descriptions apply. As will be seen, they embrace practically all the most marked types, and give in a small space a capital idea of the marvellous versatility of this species. The plate also shows a few of the best varieties of our Native Spleenworts, which, although belonging to a genus of peculiar constancy, and rarely prone to vary very much in its exotic species, has been fairly liberal in "sports" in this country. We may mention that all the varieties shown were either drawn direct from fronds provided or from nature prints done by the late Col. Jones, of Clifton.

The Spleenworts represented are :—

FIG. 2.—A pinna only of a very beautiful and rare form of *Asplenium marinum*, *Asp. m. plumosum*, bipinnate and barren, since though spore heaps are apparent, they do not mature, and appear only as stripes, covered with a white indusium.

FIG. 7.—*Asp. marinum capitatum*, found in Yorkshire, bearing a heavy terminal crest on an almost bare stalk, the only really crested form of the species.

FIG. 10.—*Asp. adiantum nigrum grandiceps*, found in Ireland and subsequently in North Devon, a very fine form, as shown.

FIG. 14.—*Asp. trichomanes incisum*. This is the true plumose form of the species, and has been found several times. The best form is that shown, which was found by Mr. Clapham. Always barren. The counterpart of "*cambricum*" in *P. vulgare*.

FIGS. 16 AND 17.—*Asp. t. ramo-cristatum* and *cristatum*. Prettily crested forms, finds of which have been made on several occasions.

The Lady Ferns are :—

FIG. 1.—That extraordinary and unique fern, *A. f.f. Victoriæ*, really a pericristate *cruciatum*, in which both the

pinnæ and pinnules are in pairs, set on at about right angles to each other, so as with the opposite pairs to form crosses, while the tips of fronds and pinnæ bear beautifully redivided tassels. Found in Scotland.

FIG. 3.—*A. f.f. splendens*. A crested (almost plumose) form, with crested pinnules. Raised.

FIG. 4.—*A. f.f. Kalothrix*. The most delicately divided of all Lady Ferns, divisions like beautiful hair, whence the name, and with a silky lucent surface. Requires shady position and protection to show full beauty. A gem.

FIGS. 5, 6, 11 and 19.—Various forms of *A. f.f. Frizelliæ* shewn in Fig. 6, viz. as numbered (5) *ramosissimum*, (11) *cristatum*, (19) *ramosum* (crest only), representing certainly one of the most striking sections of this versatile species, but rather apt to revert partially in many of its forms, which are probably crosses.

FIG. 8.—*A. f.f. plumosum* Horsfall. Found in Yorkshire; the most delicately made of the wild finds of *plumosum*.

FIG. 9.—*A. f.f. pulcherrimum*. Very prettily cut divisions, finely pointed and saw-toothed; found several times in slightly varied forms.

FIG. 12.—*A. f.f. Clarissima*. A pinna only of that wonderful fern, on which the phenomenon of "apospory" or prothalli, instead of spore-heaps, was first discovered. Almost as finely cut as *Kalothrix*, but large and robust.

FIG. 13.—*A. f.f. acrocladon*. Found in Yorkshire. Fronds so repeatedly divided as to transform the whole plant into a huge almost moss-like mass. Some of its progeny, *uncoglomeratum* to wit, go much farther, and resemble a mass of *Selaginella apoda* on finer-cut lines.

FIG. 15.—*A. f.f. glomeratum*. One of the finest *corymbose* crested varieties, with huge bunch crests at all terminals.

FIG. 18.—*A. f.f. Vernoniae cristatum*. A beautiful variant of *Vernoniae*, with peculiarly crisped and wavy divisions, rendering it very distinct.

As will be seen, the group embraces most of the wonderful types assumed by this protean species, and would form a very fine nucleus for a budding collection. C. T. D.

THE DECORATIVE VALUE OF OUR NATIVE FERNS.—III.*

The Hartstongue varieties which conform to the requirements of decorative beauty and general hardiness may, perhaps, be grouped under three heads—those which are forked and forked again, until each frond, instead of being single, looks like a set of plumes (*S. v. digitatum* and *S. v. ramo-digitatum* are typical of this group); then there are those whose fronds break into rich and full cresting at the top, *S. v. cristatum* Millett and *S. v. coronatum* are both most effective; lastly, and, in my view, the more lovely of the section, are those which come under the head of *Crispum*. Here the straight edge of the frond becomes affected. In the simpler forms it shows a gentle undulation. As the variation becomes more complex, the side line shapes itself into rich deep frills, whose setting might rival the symmetry of an Elizabethan ruff. *S. v. crispum*, *S. v. crispum robustum*, and *S. v. crispum grande* Wills are the *élite* of this section.

Among the Lady Ferns, those which rank highest cannot well be included here. The wonderful plumose varieties, which Mr. Druery has done so much to develop, do not attain perfection without glass. But the Axminster variety, from which most of them have sprung, is as hardy as it is graceful, and, with regard to others, the only difficulty is selection. Here are a few of the gems:—*Athyrium Filix-foemina Vernoniae cristata* sets off the green of its pinnulets and crests by the contrasts of deep-brown midribs; the *Acrocladon* group baffles description, so marvellous are the branching summits; *A. f. f. Victoriae* is believed to have no parallel in the fern world. All its divisions, even to the pinnules, are in pairs; one of each pair grows up, the other down; they cross one another, and are tasseled at the extremities. The whole presents the appearance of an elaborate chequer-work pattern set off

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all round with the most delicate fringe. Passing to the Broad Buckler Fern, its normal beauty needs no heightening, and merely naming two splendid varieties of the Male Fern—*Lastrea pseudo-mas cristata*, known as the “King of our British Ferns,” and *L. p.-m. polydactyla* Dadds—we come to the class which for purposes of outdoor decoration stands pre-eminent—the Shield Ferns. So numerous are the varieties of *Polystichum angulare* alone, that a whole garden might be devoted to this one species. In alluding—no more is possible—to the Polystichums, I shall confine myself to a single group of *P. angulare*, the Divisilobes; because in them the highest decorative level of British, if not of any known ferns is reached. The whole group is conspicuous alike for boldness of outline and extreme delicacy of detail; especially good are *P. a. divisilobum grande*, and *P. a. divisilobum robustum*. But it is round the inner section, known as plumose divisilobes, that interest grows keenest. Here the fronds are divided and sub-divided until it becomes no easy matter for the naked eye to discern the minute but exquisitely symmetrical divisions which result; and the pinnae and pinnules so richly overlap that the whole appearance is that of softest fur, or most luxuriant feathers. Deep in an artificial dell, contrived to afford the necessary shelter, I have raised an exceptional fine specimen of *P. a. divisilobum plumosum laxum*; a small bridge crosses just above the fern. The ordinary visitor has little in the way of praise to bestow on ferns in general, but I have never known any who did not break into exclamations of wonder and admiration as they bent over the unrivalled beauty of this empress of ferns. Another exceptionally fine member of the same family is *P. a. div. plumosum Esplan.*

We reach last the varieties of the Common Polypody. In number they are few compared with those of the foregoing species. Still, my own collection includes some twenty, and thirty-four are enumerated in the “Book of British Ferns,” by C. T. Druery, F.L.S., V.M.H. For

beauty there are those who think that such forms as *P. v. Cornubiense trichomanoides* will bear comparison even with the best *Athyriums* and *Polystichums*. While realising their loveliness, I prefer to rest their claims to special notice upon the characteristics already described—namely, their methods of growth and their readiness to adapt themselves to situations impossible for other ferns. There are two well-marked types, which should be included in every collection—*P. v. cambricum* and *P. v. cornubiense*, so called because originally found in Wales and Cornwall respectively. A third type—which characteristically, I suppose, gives more trouble—is *P. v. hibernicum*. Many graceful developments of this fine trio are in cultivation. All have the supreme merit of being at their best in winter. Unlike other ferns, they develop late, some not until August; the fronds have thus the full vigour of youth for resisting winter storms.

As I draw this paper to a close, I am not sanguine as to the success of the second part of my undertaking. It was comparatively easy to show that ferns could be made to decorate unpromising sites; it is a different matter to convey in words an idea of fern loveliness. If, however, I have succeeded so far as to arouse even curiosity, those who read may be induced to visit the nursery of some neighbouring specialist. Once they are there, all doubts as to the superlative beauty of our native ferns will speedily disappear.

H. KINGSMILL MOORE.

THE COMMON BRACKEN.

(*PTERIS AQUILINA*.)

The Common Bracken, owing to its very abundance, is rarely regarded with as much attention as its beauty deserves, for it is really one of the most beautiful native ferns when growing under quite congenial conditions, where sufficient shelter and shade permits its fronds to attain full development. What can be more picturesque than a woodland glade, beneath whose umbrageous foliage the

bracken clothes the ground with graceful shoulder-high frondage, deep enough to hide all but the antlers of the deer which may find harbourage therein. Save the Royal Fern, we have none other of so bold a growth, and that is stiff and formal as compared with the broad-spreading, pendulous, much cut frondage of the despised Bracken. The *Pteris* family, of which the Bracken is the sole British representative, is a large one, and is distinguished by the spore heaps being arranged in marginal lines, which are covered by the recurved edges of the frond segments. A considerable number of our decorative market ferns belong to the genus, as may be easily ascertained by examination of this peculiarity. Few people, even fern-hunters, have paid much attention to this species from the varietal point of view, and yet it is a very variable one, and given an extensive area covered by it, examination will almost invariably show more than one variety and generally three, viz. the prevailing common type, a much more divided one, and a very distinct, crispy, hard fronded form with narrow, leathery divisions, a darker green colour and somewhat congested habit. These distinct forms are found intermingled, and often extend for considerable distances, a frond cropping up here, there and yonder, according as the long underground travelling rootstocks have wound their way amid the labyrinth of those of their companions.

A fourth form, which we have found repeatedly, has the fronds beautifully curved, all the side divisions being arched or revolute, while the tips are more or less spirally twisted. A considerable tract of ground on both sides the road from Windermere to Bo'ness is exclusively occupied by a very fine form of this, and we found it also in quantity by the roadside near Shirenewton when visiting the late Mr. E. J. Lowe. We have noted it elsewhere, but hardly so finely characterized. Polydactylous varieties are also not uncommon, but frequently only partially fingered, and at Faygate, in Sussex, there are many acres occupied mainly, and in some spots exclusively, with a very good crested

form indeed, thoroughly constant. *Pteris aquilina congesta*, found we believe in the Lake district, is a charmingly congested or dense fronded form, which for garden culture possesses, so far as our experience goes, the advantage that the congestion appears to affect the rootstock as well and prevents it from monopolizing the garden entirely, as does *P. aq. percristata* and *grandiceps* and also *glomerata*, three other very fine varieties. The first has even the pinnules crested, and is extremely handsome, and it is from its spores that a percentage of "grandiceps" is always derived, the latter itself being barren. "Grandiceps" consists of bunch crests suspended on comparatively short stalks with smaller ones at side divisions, hardly any flat leafy portion appearing; it only grows about 2 feet high, while its parent is extra robust, and if permitted to do so travels far and wide, ignoring gravel paths or even brick walls, and invading the garden generally with a shoulder-high jungle of fronds. *P. aq. glomerata* may be described as a Common Bracken with a mania for tying itself up into knots; frond tips and side divisions thus forming dense balls, while the minor side divisions or pinnules wrap themselves tightly round the stalks. This, too, is a robust invader, and the finder in the Lake District described the colony on a hill side as hanging down it like great bunches of grapes, a curious fact in connection with this being that he could never hit upon the place afterwards.

A magnificent variety of the hard leathery type, very dense and crested throughout, was found by the writer near Pitlochry, but under the most tantalizing conditions, since there was only one large frond, springing from rocky soil and quite barren of spores, so that nothing could be acquired except the frond itself. In this connection *Pteris aquilina* is peculiar in being almost untransplantable, it roots very deeply and has a long, travelling, brittle stolon, which cannot be extracted so as to enable the plant to make a fresh start. The only way to transplant, therefore, is in the winter to dig up a solid mass of soil containing such

roots, and install the mass intact where plants are wanted. If, however, there be spores, these can be raised very freely in the usual way and speedily make plants, which if transferred to the soil in the early autumn will soon take possession and make good specimens the following season. For winter transplanting it is advisable to choose some place where the plants are small and stunted rather than where they are robust, since in that case the roots will be shorter and fuller of buds within a given space, thus affording a better chance.

C. T. D.

CRESTING IN FERNS.

One of the main differences existing between the varietal capacity of Ferns and other foliage plants is the remarkable tendency in the former to develop crests or tassels at the terminals of the fronds and side divisions. A very large number of species of different genera have sported in this direction, while nothing analogous occurs in Flowering plants unless the fasciated forms of the *Celosias* and *Asparagus plumosus* be accepted as such, which is hardly admissible except perhaps in the latter case, where it is so closely correlated with a frond-like form of foliage. In the *Celosias* or Cockscombs, and also in some abnormal forms of other plants, a crest-like form is produced by a multiplication of the terminal-growing cells of the main stem, with the result that it broadens laterally into a more or less fan-like growth. This, however, remains undivided, and it is noteworthy that this multiplication begins really at the base of the stem, the subsequent widening out being really a multiplication of the normal expansion of the flower spathe. In Ferns, on the other hand, although the tassels are produced by a similar multiplication of the growing points, this, as a rule, commences at a given point subsequent to considerable growth on normal lines. The multiplied points also speedily assume independence, thus forming as many separate strands to the tassels, which

strands sometimes again divide on similar lines, *i.e.* after growing some length undividedly. Hence the tassels do not cohere, Cockscomb fashion. The extreme regularity of the point at which this multiplication of the terminal cells takes place is very remarkable. A fern frond grows by development of apical cells and in a divided or decomposite frond, that is, a frond bearing not only side divisions or pinnæ, but subdivisions of these, or pinnules, or even further divisions to the extent of pinnulets and pinnuletines, to coin a further necessary diminutive, these apical or formative cells multiply laterally accordingly within the coiled up tips which uncoil as this process continues. This is obviously already a very complicated process, and the wonder is therefore the greater when, as in some of the most marked examples of cristation, we find that at a quite definite stage, all over the frond, these apical cells one and all commence to multiply at a different angle to form tassels, thus finishing their work on different lines to those adhered to previously.

The fact that in some instances, such as in a form of *Pteris serrulata* known as Applebyanum, we have had heavy bunch crests formed at the tip of a previous season's frond, only one strand of which had remained green and healthy, and that this crest was formed by continuous dichotomous forking throughout the season until a mass of threadlike growth formed a large ball, suggests the possibility that this cresting in Ferns may be due to an antavistic tendency for the growing points to spread on *Marchantia*-like lines or alternatively to an incapacity in the apical cells to close the circuit, as it were, and form a terminal wall or skin, as they should do normally. This case, however, forms an exception to the general rule of cresting, since the tassels are usually complete when the coil containing them unfolds, and all they do subsequently is to expand to full size without any subsequent extension of structure. In a number of cases this faculty is developed more or less irregularly, and grades from single fronds, once divided at their tips or

it may be even at their bases, forming twin fronds, or otherwise normal plants, to fronds which ramify to an indefinite extent from the base upwards to form wide fans or even mosslike balls. As a general rule, however, the crestring is terminal and even, the subdivisions of the frond displaying precisely the same character as the frond itself, only on a smaller scale, so that the heavier and more pronounced the crest is at the frond tip, the greater the probability that the crestring will extend to the minor divisions; and the cases are rare where these latter are markedly crested and the frond tip scarcely so, and still more rare where the frond is well tasselled and the side divisions not at all.

A peculiar feature of the tasselled ferns is their unreduced fertility as regards spores, the sori being almost invariably extended into the crestring in robust plants. This fact is the more remarkable, as generally where the leafy area of a frond is abnormally extended, as in the plumose or extra divided Ferns, this is correlated with a reduced spore production or even with complete barrenness, as we may see in the crispum or frilled Hartstongues and the several forms of *Polypodium cambricum*. This difference is, however, partly accounted for by the fact that in many crested forms of Ferns the minor divisions are more or less contracted as if to counterbalance the extra area involved in the tassel at their tips.

As a rule, the spores of crested Ferns reproduce the crestring truly, but not infrequently their progeny varies so that a batch of seedlings may consist of exact reproductions of the parental type mixed with others which are of more marked character or the reverse, and even without crests at all; these last, however, are never, in our experience, normal unless the parent is normal, with only a somewhat variable crest on merely forked lines, indicating inconstancy or lack of fixity of type. The faculty of crestring is very often associated with other abnormal characters, such as congested or extra foliose or more finely-cut frondage, and as the tassels themselves differ very widely in character, some

being dense, others lax, some on fan-like plans, others corymbose or bunchy, some long and pendulous and others stiff and erect, the number of distinct varieties is very great, especially as it has been demonstrated that crossing is practicable, so that crests have been imparted thereby to non-crested varieties endowed with other characters.

C. T. D.

FERN WONDERS.

Few people when on their holiday rambles they see the common Ferns of the wayside lining the hedges and ditches, or, penetrating into the woods and glens, find them forming the chief vegetation, filling every chink and cranny with their feathery verdure, reflect or know that in the dim and distant past, such a growth, on a more luxuriant scale was slowly building up the Coal upon which the material prosperity of Britain is so largely founded. Yet in those old days, Ferns and their allies, only differing in minor details from those of the present, century after century, sucked up the carbonic acid in the air around them, built the solid carbon into their tissues, and eventually, as generation after generation died and decayed banked up, as it were, this imperishable element for man to use thousands of centuries later. This is no scientific guesswork, the very fern-fronds, as every coal miner knows, are often to be seen intact and recognizable when the virgin coal is split by the pick, and scores of species have been thus found and identified as close relatives of our Ferns of to-day. At the Coal Exchange, London, is a fine collection open to the view of the incredulous.

Ferns to-day, owing to their lack of flowers, take a back seat with lovers of bright colours, but, wonder number two, even as our coal tar yields our aniline dyes, so it is evident that in those simple green fronds lie bottled-up rainbows resolvable by the alchemy of time into their most brilliant hues, so that many a dame decked in the brightest tints, outrivalling the rose itself, owes her borrowed colours to the ferns of æons past.

Wonder number three. So careful is Nature of these first-born children of hers, that every season, instead of the few hundred or thousand seeds yielded by her floral offspring, Ferns cast off millions upon millions of spores, each capable of yielding not one but more, so that a single plant could people a district in one generation. Eleven hundred millions were estimated by the writer as the crop of one Lady Fern in one season.

But wonder number four, with which we will conclude, though not exhausting our list, is the singular fact that our native British species, some forty odd only, have yielded far and away more "sports" or beautiful varieties *than all the rest of the world's species put together*, some four or five thousand, indeed, can be distinguished as quite distinct by connoisseurs, and the bulk of these have been found wild in our woods and hedges of the western counties and elsewhere where Ferns grow profusely. At Kew Gardens there are two or three thousand, forming such a collection as exists nowhere else in the world. These varieties are mostly charmingly tasselled at all their tips, or curled or finely cut, so as to be far more beautiful than the common forms, others are oddly varied and though, perhaps, more curious than beautiful, are extremely interesting.

We must, however, add another wonder, for it is perhaps the biggest of all in this special connection and that is that, even as a prophet has no honour in his own country, so this unique British branch of botanical study has been until recently so far ignored by nurserymen, horticulturists and gardeners generally, that the true British Fern fanciers are few and far between, and the popular idea is, or rather was, that they are fairly represented by the wild weed forms obtainable from the street hawker at a penny a root.

C. T. D.

VARIEGATED HARTSTONGUES.

So many disappointments have been connected with presumed variegated Hartstongues that the expert is rarely

satisfied when a specimen is brought before his notice that it is likely to remain so, and we have even heard doubts expressed as to the existence of a really constant form. The reason of this uncertainty lies in the fact that this species and its varieties is peculiarly prone to assume a decidedly yellow tint, sometimes with stripes or mottlings of the normal green colour, when something in the soil or the environment disagrees with it, and as a rule this phenomenon is noted in plants which are exposed to bright sunshine. Recently we were shewn a considerable number of very diverse varieties in the garden of Mr. W. B. Cranfield, at Enfield Chase, nearly all of which were variegated as described, and yet they all belonged to batches of seedlings or divisions of the same varieties which had been planted elsewhere, and were there all of the same normal green colour without a trace of variegation. None of them, however, were robust and healthy, and they were all, like many associated other species in the same plot, more or less out of condition, the soil having become waterlogged and sour. Here obviously was conclusive proof that variegation may be temporarily assumed when soil or other conditions are unfavourable. On the other hand, a large and very strikingly variegated but otherwise normal Hartstongue, found by the writer in 1909 at Staverton, in Devon, with most of the fronds of a bright golden yellow throughout, and the rest more or less striped or mottled, was growing in a most congenial position on the low bank of a small stream, and by its large size and development was obviously in perfect health. It was, however, quite unsheltered from the sun, and when carefully lifted, potted and placed under glass, although the following season, it grew again to full size, not a trace of variegation appeared. In this case then it was clear that the variegation was induced by extra bright illumination rather than by any other handicap to healthy growth. Variegation of this class, which is solely due to local influence and disappears under change of environment, cannot therefore

be regarded as a true varietal character, and it is certainly to this class that the great majority of so-called variegated Hartstongues belong, and it is hopeless to expect that more marked and constant forms can be raised from their spores.

That truly variegated Hartstongues exist is, however, beyond a doubt. In Mr. Cranfield's garden we saw a specimen derived from the collection of the late Mr. Moly, and found by him, in which, amid a majority of normally green fronds, there were a few bearing definite and closely-placed pure white stripes, obviously an inherent character and quite distinct from the common indefinite yellow types above described. This plant had previously shewn the character associated with little or no reversion, and must therefore be ranked as constant so far as the innate tendency to produce pure white stripes was concerned. From Mr. Amos Perry's large collection at Enfield we were fortunate enough to obtain two promising specimens, one a nearly normal and the other a pretty capitate form, which when acquired were of a lemon yellow throughout, and both of these, after two seasons' growth under glass, have thrown fronds of vigorous healthy growth, but one and all of the same pale yellow tint, so that we are persuaded that at last we have not one but two constantly variegated specimens, from which we hope to raise a brood. We have heard of marginally variegated Hartstongues being found, *i.e.* with quite white edgings, but have never been able to obtain confirmatory fronds, and should be very glad to hear of such. Several plants were found in Devon by Mr. Cranfield and the writer with light green fronds striped here and there with the darker normal green, and these shew the same appearance this season, fairly markedly in Mr. Cranfield's case but somewhat less so in ours. Here again then there is an approach to constancy, which might yield better results if sown from. A very markedly yellow variety of *crispum*, obtained from an exposed position on the rockery of Sir Frank Crisp, at Henley, grew vigorously under glass but shewed there no

tendency towards the light colour, but when transferred to the open, a sunny situation such as it had previously occupied, that central portion of all the fronds which should have been yellow remained quite healthy but became a reddish brown, the edges remaining green, shewing thus that the partial variegation was due to a partial constitutional difference in the chlorophyllic response to direct sunshine.

Should any of the members of the Society possess really constant specimens which remain true under the ordinary sheltered conditions and are not apparently handicapped in any way by undue exposure, the writer would be happy to receive fronds and particulars, so that some of the uncertainty in this connection may be removed. Under natural conditions, where Hartstongues are abundant on old walls and in the woods and hedgerows, the yellow colour pervading the fronds as seen in some collections is extremely rarely seen, and is undoubtedly due in those collections, as a rule, to something unfavourable to proper development, a sort of chlorophyllic anemia. C. T. D.

EFFECT OF ENVIRONMENT ON VARIATION.

At Christmas, 1908, a very marked form of Hartstongue was found by the writer at Babbacombe, near Torquay, growing high up on a road-side wall. When noted it was a fairly vigorous plant for its situation, having several fronds six or seven inches long, all of which were very ramose, being divided into numerous spreading narrow segments, resembling stag-horns, and of hard tough texture. As it was tightly frozen into a mere chink, only as much of the conde could be extracted by cutting to secure the visible growth with a few rootlets, quite sufficient, however, in this species to secure future growth under proper culture. It was carefully potted and placed in a Wardian case, and in the course of the following season grew vigorously and developed a number of fronds. These however, were of quite a different type to the original

ones, resolving themselves into two forms, one quite thin and papery and with merely dilated tips or small crests, while the others, of somewhat tougher character, were branched into leafy divisions, each of which was branch-crested on flat lines, but in nowise resembling the stag-horn type. Upon the surfaces of the basal lobes of all these latter fronds, but on only one or two of the other type, one or two strong bulbils appeared, and also a few small ones on the stalks below the lobes, while one very strong one appeared on the surface close to the angle of separation of a branched frond. The form of viviparousness is very rare in the Hartstongue, and only one other case of lobe bulbils, and that on a minor scale, has come within our ken. By the end of the season of 1909 the plant formed a bush of several crowns, and was a handsome specimen.

This season it resumed growth vigorously in the spring, but this time the fronds were all much more on normal lines, though in all cases bearing flat crests, they were much longer and only here and there quite small bulbils appeared of a brown colour, which shewed no tendency to develop, as did the previous ones, aerial roots and frondlets, though still, as will be noted, growing under the same close conditions as before. It will thus be seen that the plant has passed through three stages, first that of a narrowly-branched tough stag-horn type, in which the viviparous character was not noticed, though possibly present; secondly, a more foliose thinner-fronded stage, accompanied by branching and cresting on dimorphic lines and with proliferous buds of a vigorous character, forming several fronds and aerial roots *in situ*, and finally a form little better than an ordinary crested and otherwise normal one.

We have now transferred the plant to the open in a somewhat sheltered bed, and it will be interesting to note whether, restored to open air conditions, it will resume the original stag-horn type, or whether the series of changes prelude entire reversion to the normal. This, of course, remains for the next season's growth to shew.

It is difficult to draw any particular conclusion from the facts of this case, but we think it merits record as a singular example of how different environment may affect a varietal form, and we should be glad to have particulars of other cases which may have been observed of a like nature. It is of course well known that varietal characters are apt to be much less marked in plants which are out of condition and stunted by unfavourable factors, but here the changes have been accompanied and indeed appear due to growth stimulated to the utmost and vigorous and healthy from the start, although, since repotting was certainly needed when the transfer was made to the open, the third stage may possibly be due to root restriction. C. T. D.

POLYSTICHUM ACULEATUM "GRACILLIMUM."

This very beautiful section of the Hard Shield Fern family has been fully described and figured in the early number of the *Gazette* (pp. 3, 24 and 50). Its sudden appearance in a fair percentage of seedlings of *pulcherrimum*, and its unique character, rendered it an interesting question whether another sowing would give like results. Fortunately last season another plant shewed spores, and these being sown, our readers will be interested in learning that the new and slender character is already clearly perceptible in a number of the youngsters, so that a second batch of acquisitions on similar, or, judging by the diversity in the first batch, even new lines may be confidently anticipated in the near future. ED.

NEW FERNS.

At a recent visit to Messrs. H. B. May & Sons' Nurseries, at Edmonton, we were shewn a new and improved form of *A. f. congestum minus*, into which "*setigerum*" blood has apparently found its way; the ultimate divisions of the fronds being beautifully crispy and bristly, while the

charmingly dense and compact growth is unaffected. Both crested and uncrested forms had originated from a sowing of *A. f.f. congestum minus cristatum*, a good few plants showing the new character very distinctly and much improving the delicate appearance of the plants. It has been provisionally named *A. f.f. congestum minus fimbriatum* and ditto *cristatum*, as the case may be. A prettier dwarf form can hardly be imagined.

Another new variety was *Lastrea filix mas Barnesii crispa cristata*. A crispate variety of *Barnesii* has been known for some little time, in which the short oval pinna of *Barnesii* is clearly distinguishable, though prettily curled and crisped, but in this the additional charm of well-developed bunch tassels at all tips is presented to good effect. We believe, however, that so far only one specimen exists, which, however, will certainly be propagated as soon as possible. We have often wondered what some of our old Fern pioneers, who have long joined the majority, would think if they could see some of the latest developments from their "finds" or acquisitions. Certainly, whatever their pleasure in finding or acquiring the original progenitors of such gems, they never anticipated the potency within them of producing such advanced types as they have done.

C. T. D.

LIST OF NEW MEMBERS.

- Mr. J. Chapman, The Gardens, Westonbirt, Tetbury.
 M. B. Barrel, 10, Avenue d'Iena, Paris.
 Mr. Jas. Davidson, Sommerville House, Dumfries.
 Mr. William Jas. Shaw, 23, Nesterville Avenue, Belfast.
 Mr. Frederick Start, East Lodge Gardens, Enfield Chase.
 Mr. H. H. Raschen, 56, Liverpool Road, Birkdale, Southport.
 Mr. F. A. Edelsten, The Elms, Forty Hill, Enfield.
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 Mr. H. Relton, Underfell, Low Fell, Nr. Gateshead.
 Mr. J. C. Rugman, Plusterwine, Woolaston, Nr. Lydney, Glos.

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This book constitutes an invaluable guide to the selection of the best forms for high-class collections. It was compiled by the Editor, with the assistance of a Committee of the British Pteridological Society, all experts, and contains descriptions of about 700 of the choicest forms, illustrated profusely, and accompanied by chapters on Fern Culture, Fern Hunting, and indeed all matters of interest in connection with the cult. It can be obtained from the Hon. Secretary and Editor, Mr. Chas. T. Druery, 11, Shaa Road, Acton, London, for 3s. 9d., post free, and may be regarded as absolutely indispensable to the real lover and grower of British Ferns and their varieties.

N.B.—As the covers of the few remaining copies in stock have become discoloured by damp, these will be supplied for 2s. 9d., post free, instead of 3s. 9d., the published price. Early application is advisable.

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EDITORIAL NOTES.

The Editor is greatly pleased that in this issue he has been enabled to subordinate to a considerable extent the hitherto inevitable C.T.D. element, several members of the B.P.S. having kindly contributed their knowledge to its contents. Dr. F. W. Stansfield's account of the *Kalothrix* pedigree is peculiarly interesting as throwing some light on the origin of that unique Lady Fern, and accepting his views as correct, it is gratifying to know that in this instance, as in so many others, we owe this acquisition entirely to Dame Nature's inspiration, though it is by pure chance that the original wild form should have re-asserted itself so many decades after it had practically disappeared. To Mr. C. B. Green, too, we are indebted for our frontispiece, and his interesting notes on the numerous members of the Fern aristocracy which it depicts. The Rev. E. H. Hawkins also contributes a welcome article on Gloucestershire Ferns. With our now considerable membership, however, we must again appeal for more support of this

class. Many must have had experiences in Fern hunting and raising which would interest others, and if the pen be a somewhat reluctant or unaccustomed aid to such records, the Editor will be glad to supplement any notes by putting practical material into form.

Numerous very gratifying recognitions of the value of the "Gazette" have been received, but we should much like to increase its attractions pictorially, and also even in volume. Here, however, the question of funds is involved, and as this would only be practicable by an increased number of subscriptions, the Editor would ask the existing members individually to bring the Society before their fern-loving friends who are non-subscribers, and do their level best to enlist them in our ranks. If each member would not rest until he had enlisted one new one, our object would be attained, and the value of the "Gazette" be correspondingly increased. A specimen number will be willingly sent to prospective members, and the small subscription of 5s. per annum, entitling to membership and four issues of the "Gazette," is moderate enough to reach all pockets.

11, SHAA ROAD,

THE EDITOR.

ACTON, LONDON, W.

N.B.—Less than a dozen of the copies of "The Book of British Ferns," with soiled covers, remain unsold, and can be supplied to members at the reduced price of 2s. 9d. post free. These exhaust the Society's stock of the work.

OUR FRONTISPIECE.

Our member, Mr. C. B. Green, of Acton, has very kindly provided the photograph of his Fernery, which has been here reproduced. The following article, entitled "My Fernery," describes its contents, together with some very interesting observations on their culture, etc., which we have persuaded him to extend, and which will be continued in our next issue.

“MY FERNERY.”

BY MR. C. B. GREEN.

Although nearly all our British Ferns, and their varieties, are capable of withstanding a very low temperature, yet in and about large towns it is desirable, in the interest of the ferns themselves, to provide some sort of protection from the dirt and dust and foul gases incident to all districts where houses are crowded together. Hence my choice varieties have been collected under glass, and although this involves constant supervision and some self-denial, still, “the labour we delight in physics pain.”

For the benefit of possible imitators, I may say that the dimensions of my small Fernery are 20 feet by 12 feet, with corresponding head-room. On one side a rockery about 3 feet wide runs the whole length of the house, while on the other a border of the same width, including one end, is the prevailing feature. This gives me a clear space of 17 feet by 6 feet, which is concreted, and on which I stand my specimen plants in pots, or otherwise elevate them on drain-pipes, as befits their beauty.

Roller-blinds are preferred to screen them from the sun, and top and bottom ventilation is adopted to secure a free circulation of air.

This, in short, is the arrangement of “My Fernery,” and now for the Ferns, its *raison d'être*. In the frontispiece, which is from a photograph taken as recently as August, the Ferns on either hand in the immediate foreground are representatives of one of the most amazing sections of our lovely Shield Ferns.

Polystichum angulare plumoso-divisilobum Esplan is worthy of its elongated designation, and came to me as a bulbil from our old friend Mr. Whitwell in 1899; while *P. a. plumosissimum* was sent me as a tiny plant by Dr. Stansfield three years ago. This latter fern, however, while characteristic of its name, is not quite so “sissimum” as the one illustrated in “The Book of British Ferns,” which was presumably grown in a warm house.

It is, however, a superb thing, and I would not be without it, so I think it will be conceded that these two ferns are a very fitting introduction to "My Fernery." In fact, I may here say that these self-same plants have had so much influence over a near neighbour of mine as to turn him into a pteridologist! His next step, therefore, ought to be "incorporation" in the B.P.S.

Other *Polystichums* of the *plumoso-divisilobum* type are *Grimmondii*, *laxum*, and *densum* Fox; while *plumosum*s proper—only a degree or two less beautiful—are represented by Moley, Patey, and Wollaston, all, by the way, true wild finds. To still recede slightly we have such good things as *Crawfordianum*, *decompositum* Pearson, *cristatum* Ivery, *grandidens* Fitt, *acrocladon* Mapplebeck, *cristatum* and *longipinnatum* Carbonell, *perfectum* and *nitescens* Jones, and that silken beauty *setoso-cuneatum* Phillips.

Longipinnatum and *nitescens* came my way through Mr. Whitwell. The former makes a splendid basket plant, while the latter *nitescens* would be equally suitable, for the fronds are exceedingly soft and lax.

Turning now from the Soft Shield Ferns it will perhaps be pardonable, under the circumstances, if I refer with more gusto to the Hard Shield section.

Although the varieties here are few comparatively, there is one which is not only "beautiful" but unique—*P. aculeatum pulcherrimum*. This fern, then, is a host in itself, and is, just now, in special favour with Mr. Druery and myself, for the sporing of this previously presumed sterile variety in "My Fernery," in 1903, has resulted in such a progeny of symmetrical youngsters that superlatives seem superfluous to specify their superiority.

They must be seen to be appreciated. As, however, this unique evolution or break-away from the parent form has been well told in the "Gazette," and other journals, I will content myself by referring to the illustration, where in the middle distance, and nearly central, my *plumosum* appears; and on either side and above some

others of the *gracillimum* type. I think I may, therefore, without excess of pride, conclude that these plants alone have justified the existence of "My Fernery."

With reference to the parent plant, I have just been overhauling it; and although some substantial divisions were extracted from it three years ago, it is still a grand specimen. Its fronds number over sixty, and many of them are four feet long.

This vigour, of course, is due to planting out.

As to watering—well, when a plant like this gets thirsty half a drink is worse than none at all; in fact, these large specimens are terrible dipsomaniacs, and remind me of the farmer who drove up to an inn and after *tasting* a couple of quarts said "he thought he'd now git down and 'ave some!"

From Shield Ferns to Lady Ferns is not a great way, for both are aristocrats in refinement and delicacy of detail. But while the Lady Ferns may be regarded as early summer visitants only, the other section is always with us. And although in this case familiarity does not breed contempt, it must be admitted that the deciduous character of a *plumose* Lady Fern is such as hardly to allow one sufficient time to become "familiar." When I refer to a *plumose* variety of *Athyrium Filix-fœmina*, I have in mind the unrivalled forms of Mr. Drucry's raising. As I possess all, or nearly all, of this *superbum* strain—mainly through the generosity of the raiser—I have many opportunities of observing their superiority. They are planted in my border alternately with evergreen varieties. Thus they illustrate, so to speak, a progression of beauty from *Axminsterense* to *Drucryii*. These are still in fair condition for the time of year (October), which fact again is due to border culture. There are several other Lady Ferns whose condition is improved and prolonged by this treatment. *A. f.f. Elworthii*, for instance, is a huge clump with fronds over four feet long; while *percristatum*, Cousens X *Kalothrix*, has over forty fronds about three feet

long, the pinnæ of which measure over eight inches. Moreover, the habit is shuttle-cock-like with gracefully pendant foliose fronds.

(*To be continued.*)

BRITISH FERNS OF THE FUTURE.*

When we compare the wonderful and beautiful varieties of British Ferns with those which were in existence half a century ago, the question naturally arises whether such advance can be continued on the same scale, or whether sooner or later the possibilities will be exhausted. At the time referred to, judging by the published catalogues of the period, really fine symmetrical and constant varieties were very few, and consisted mainly of wild finds, that is, finds which had only been propagated by offsets and not by spores, so that practically all the specimens extant of the particular type were identical. The rest of the varieties on the market consisted largely of irregular and defective types, which had resulted from injudicious sowing of erratic forms, a number of which, experience has shown, are far more apt to propagate themselves spontaneously than are the better types. This fact led to their introduction as easily-raised market plants, whose value was then apparently determined by their curious character: the greater their eccentricity the higher the price. The number of these eventually so far exceeded that of the "thoroughbreds" that a revulsion of taste was inevitable, and, for decades, the popular idea of British Fern varieties, if any idea was formed at all during the period of depression, was that they were more ugly than beautiful, and hence unworthy of attention. Meanwhile, however, the handful of enthusiasts who, by their own discoveries and selective culture, had become acquainted with the finer varieties, were more and more encouraged by the results they had attained, and by degrees worked up collections of most beautiful, thoroughbred types, which in

* By permission of the *Gardeners' Chronicle*.

time eclipsed, in charm of plummy dissection, or ornate tasselling, or frilling, anything which could be found among exotic varieties. Every now and again, too, altogether unexpected results occurred among the spore sowings, new strains coming to light in this way which surpassed their predecessors in delicacy and grace, and it also became clear that the possibilities of combining such charms by hybridising were fully demonstrated, both by systematic cross-fertilisation and chance results of mixed sowings. Now, in our opinion, it is this last phase of Fern culture which widens the horizon of future possibilities. So little comparatively has it been worked out that we may count the recognised crosses upon our fingers, and in this connection the example of *Polypodium Schneideri*, a successful cross between the two different species of *Polypodium*, *P. glaucum*, a large growing, tender exotic and *P. vulgare cornubiense* (*elegantissimum*), a beautifully-divided form of the hardy, common Polypody, indicates an immense field of utility in the direction of decorative plants. True, it may be argued that we cannot legitimately claim such results as British Ferns proper, but if it is our British Fern of an abnormal but beautiful type, which imparts its particular charm to a purely normal exotic, we are surely entitled to claim the major part of the merit involved, especially if the results be, as it is largely in *Polypodium Schneideri*, and might be entirely in less tender species, the production of nearly or quite hardy plants possessing the charm both of the exotic form and that of the home variety. We recommend this field to the particular attention of exotic Fern growers, whose possession of warm greenhouses gives them special facilities for experiments, which can take the simple form of persistently sowing spores of fine British varieties with those of allied exotic species on the offchance of a cross. But, apart from such experiments, there are innumerable British varieties of one and the same species which would be greatly enhanced in beauty could the charm of another variety be added. We will take the

common Polypody forms as a type. *P. v. cornubiense* has already been crossed with *P. v. bifido-multifidum* so as to obtain a crested *cornubiense*. *Cornubiense*, however, is an erratic Fern, and persistently transmits its erratic character to its offspring even, as we see in *P. Schneideri*, when crossed with another species. *P. v. pulcherrimum*, however, is a thoroughbred tripinnate form, and a successful cross between this and *P. v. cristatum* or *P. v. grandiceps* Fox or Forster could not fail to form a handsome combination unlike anything we possess. To revert to exotic blood there are, on the other hand, a number of simple fronded, exotic *Polypodiums*, which, if they could be induced by the gentle influence of *pulcherrimum* to bear tripinnate fronds instead of simple or pinnate ones, would be far more ornamental than they are at present. In another genus, the *Polystichums*, we have numerous exotic forms, some like *P. setosum*, perfectly hardy and very distinct from our native species, though viewed by some botanists as a form of *P. aculeatum*, which could be improved by crossing with some of the finely-crested *plumosums* or *cristatums*. As there is no doubt that many of the exotics are very closely allied indeed to our home species, the chances in this direction are very great. *P. setosum* is a fairly common market plant here, and we strongly advise, in connection with it, the procedure advocated above. In the Spleenwort family, too, a race, as a rule, peculiarly constant to the normal type, we have marked exceptions to this rule in the crested forms of our native *Asplenium trichomanes* and *Scolopendrium vulgare*. Fortunately for such experiments, difference in size forms no bar to crossing, and, in the initial stages, the growths vary little in their dimensions. Hence we have no such obstacles to crossing as are involved in the fine adaptations of size of pollen grains to length of style incidental to flowering plants. The main obstacles to the cross-breeding of Ferns consist, apart from wide generic differences, in differences in the rapidity in germination of the spores. A little study, however, may

enable this to be overcome by sowing the spores at different times. In any case, the field of experiment is large, the difficulties to be overcome but trifling, whilst any results obtained must be valuable, since, even though crossing resulted in failure, the progeny of such good forms as should only be used, would have their commercial value.

CHAS. T. DRUERY, V.M.H., F.L.S.

BRITISH FERNS IN GLOUCESTERSHIRE.

BY THE REV. E. H. HAWKINS.

I venture to make a contribution to our "Gazette" on the grounds that I have been a fern-lover for forty years, and further for the past thirty-five years I have been a very constant admirer of those wonderful plants collected and bred by the late Colonel Jones, and which are still under the unremitting care of my good friend Mr. Harris, superintendent of the Clifton Zoological Gardens.

I cannot but think there is a great future for British ferns. Fernists have made their peace with florists and gardeners. It is not now a question of flowers *versus* ferns—"both are best"—and every garden can provide the proper place for each kind of plant. Gardeners, too, have come to this conclusion. "Monstrosities" are dead, they did much harm before they were relegated to the dust heap. Shewn to the uninitiated as things of beauty and of joy, they quenched any incipient desire of possession. There must be no place for the unshapely things, inconsistent even in their ugliness. We have such a glorious heritage from those who have gone before us, plants which, as Dr. Kingsmill Moore has rightly said, "never fail to obtain a tribute of lasting admiration."

Just at first the names are a source of terror and of helplessness to the beginner. A little time and patience get over all this—the dictionary, the lexicon, the school-

master can be called in as "first aids." It will be found that the names are as a rule very appropriate, *e.g.* *scopæ*, *acrocladon*, *corymbiferum*, *Polyst. aculeatum gracillimum*, is, notwithstanding all that has been written contrariwise, very applicable to Mr. Druery's latest and best.

It may not be out of place if I say what Gloucestershire can do in the way of ferns.

Two years ago my friend, the Rev. S. Hillard, now of Bedford, shewed me a frond of *Asplenium fontanum* which he had just found growing wild in Chalford, near Stroud. The plant is still there, so far as he and I are concerned, but alas! we cannot find it.

Scol. spirale was found at Nailsworth, and *crispum Cowburnii* at Chepstow, which is just in and out of Gloucestershire.

Polypodium calcareum grows freely on rubbly hillsides; but the hawker, wretched man, is doing his utmost to destroy it root and branch.

Gloucestershire will always rank high among the counties because of Colonel Jones' collection at the Clifton Gardens. They have already been described by Mr. Cranfield in the "Gazette." He remarked on the absence of certain varieties. All lime-loving ferns are there, with one very remarkable exception, there are no polypods—they were there in variety and abundance, but they all passed away—and if ferns cannot, or will not grow under the skill and care of Mr. Harris, Dr. Stansfield might safely include them among those cited in his article on "The Culture of some difficult British Ferns." Polypods do grow all over the county, yet only in a timid and half-hearted fashion.

Ferns have other and stately homes in our Western shire, wherein they make a noble show, long to be remembered. My friend, Mr. S. S. Malling, of Stanley Park, Stroud, has already a splendid collection, though yet young in years. They revel in their ideal surroundings, sheltered by the trees and nourished by the moisture from the lake.

There is seen the *Athyrium* in its manifold variety, but beyond all there is *Polystichum divisilobum plumosum* in all its glorious shades and shapes of colour and form. No "withered cheek nor tresses grey" among them, the rusty tips are happily absent, for it is a plant that revels in the fresh air.

Colonel Sir George Holford, of Westonbirt, Tetbury, has, too, a collection of British Ferns which adds even to the beauty of his beautiful grounds. They are all carefully selected plants, "Monstrosities" are rigorously excluded, and the number of good ones is increased yearly.

Mr. Thos. Kingscote, M.V.O., of Cirencester, has also joined the ranks of Gloucestershire fern-growers, his bold and beautiful rockeries are already rich in ferns of the first water. I think I am right in predicting a prosperous future for the once despised fern—"only British or hardy, you know."

In these days of Form IV. it is not happily given to many of us to be possessors of broad acres or extensive grounds, yet we have, most of us, a backyard and a corner of the garden facing north—such are my humble possessions. Here I succeed in growing, or rather the plants are good enough to grow for me, in many varieties.

My study looks out on a yard facing due north—it was such a horrid hole—unsightly winter and summer, dismal beyond words, dull, damp, moss-covered gravel—who could redeem it? A few cart-loads of stones became a rough and natural-looking rockery. There are plants there thirty-five years old, still flourishing in their old age, for I keep them to the one crown. I have them ancient and modern, for who would not provide a place for at least some of the newest and best?

Of course, my friends and I have our enemies—my greatest are the cold winds of the early spring, and when shall we have again a seasonable spring? After various experiments, pots, pans and frames of glass, I have

found suspended nets the best and simplest protection—but even so I, too, often lose the first fronds.

Writing only from my own experience, I am on the whole more satisfied with my plants grown in pots under glass than those grown in the ground and under glass; the former can be removed outdoors in the hot weather, they do so well in the shady corner; the latter grow more luxuriantly, but I think they are apt to lose their distinctive character.

I know it's wrong, I know the pain and disappointment of the days to come in attempting to grow *Polyst. ang. divisilobum plumosum* in glass-covered ground, yet I cannot resist it, there is nothing equal to the charm and beauty of the early fronds ere the rust sets in. I can only plead my countryman's excuse, "Better be a coward for half an hour than dead all your life."

Some of our friends may be about to start fern-growing, if so it may not be out of place if I give them a few words of advice. It is useless to grow ferns among and under trees without some spade work. I suggest, then, that the space be dug out, the bottom slated, or better still concreted, and the sides protected with corrugated sheets of iron. After making a drainage of stones fill up the bed with leaf mould and loam. Result, you will have a bed undisturbed by roots for years to come. My second word of advice is this, have nothing to do with fern hawkers. We are fortunate in our leading men in the trade, they can be trusted absolutely. Beginners cannot do better than put themselves in their hands, they will get plants suitable to the various soils and localities, and with them cultural directions are always good.

Wild finds and seedlings of one's own growing will come later. In the language of the late Mr. Lowe, "attention to the above remarks may prevent disappointment."

I am inclined to think that ferns, like potatoes and human beings, are fond of a change of air and scene.

I am experimenting on the best of all Polypods, "*semilacerum*," imported from Cork. In its first year it did badly, suffered as an exile or a rebel, out of sympathy with its Saxon neighbours—close proximity to its Welsh relatives reconciled it. Now in its third year it holds out a promise, dare I venture to hope, of *omnilacerum*. In historic language, "I shall wait and see."

A SUCCESSFUL SPORE SOWING.

Since the sowing of Fern spores, on judicious lines, undoubtedly forms one of the most interesting branches of British Fern study, a few notes regarding a particularly successful sowing may not be out of place as indicating the right course to pursue. In July, of last year, stimulated by the wonderful crop which had resulted from a previous sowing from that beautiful thoroughbred *Polystichum aculeatum pulcherrimum*, the results of which have already been described and illustrated in the first numbers of the "Gazette," I carefully examined my plant, a division of which, given some years back to Mr. C. B. Green, had yielded the few spores from which such an unexpected crop had arisen. It will be noted that although practically the same plant, the separate divisions had been grown for years in different ferneries in different hands, and to a certain extent in different ways, since Mr. Green's plant was established in the soil while mine had been grown from the outset in a large pot. To my great delight I found that, for the first time, a good number of spores appeared on my plants, though Mr. Green could find none on his much larger specimen, and, naturally, I lost no time in collecting some and making a fresh sowing. It was, of course, a very open question whether spores of another season and from a plant in a different environment would repeat the previous results, but in any case, even if only the beautiful parental form appeared, both time and labour would be well repaid.

I therefore took two small shallow pans about five inches diameter by three deep, and having put plenty of drainage, filled them nearly full with fine open fern compost of loam, leaf mould with a little sand, pressing this down flat with the bottom of a similar pan. This done, I placed a piece of paper on the soil upon which I poured boiling water until scalding water ran freely away below. I then covered both with glass slips and allowed them to get cold. Meanwhile, I had severed the pinnules bearing the dot-like spore heaps and laid these upon a glass slip on the field of my microscope under a glass shade, and, after a few hours, on examination I found the glass fairly profusely peppered over with the shed spores escaped from the burst capsules. I then breathed upon the glass until it was covered with mist, when a small puff blew away the now dried pinnules and the empty spore cases and left the clean spores attached temporarily to the glass. By this it will be seen that I got rid of any conferval or other germs possibly adhering to the debris in question, and secured the purest possible culture on the already sterilized soil. I then tapped the glass slip gently over the two pans, distributing the spores as evenly as possible, and after covering them again with glass, installed them in a Wardian case facing north, standing them in two red-ware saucers containing a little water.

In due course the little green prothalli made their appearance in great numbers and in a few months, assumed full size and became fairly crowded. No signs of the ferns proper appeared during the winter and even well into the spring, although the prothalli increased abnormally in size, they remained apparently otherwise in *statu quo*. About May, therefore, I poured tepid water over the prothalli, and also immersed the pots in water until the prothalli were flooded from below, and very shortly after the first fronds began to push up in quantity, and it became evident that more room was required than their crowded condition provided. Some pans, nine inches

square by three inches deep, were therefore prepared and sterilized by hot water as before, and small clumps of prothalli, about one-third of an inch across, were pricked out with a penknife and inserted an inch apart, being just pressed home by the finger in little cavities made to accommodate them. A sheet of glass was then laid over each pan, and these were placed on a well-lighted shelf. The result was, that in a few weeks the pans were as full of young plants as the original ones were of prothalli, necessitating the supply of further room. To afford this it was now necessary to separate not merely clumps of prothalli, but young rooted plants, and it is here perhaps that a hint is welcome as to how to do this with a minimum of loss where the crop is of such a character, that the loss of even a minute plant may mean the loss of a great prize. My plan is this. Each clump of youngsters resulting from a patch of prothalli is easily extracted intact. Taking a deep soup plate filled with water, the clump is immersed in this up to the young growth, and the soil is thus so softened and the roots so loosened, that beginning at the outside every individual plant can be coaxed away with its fronds and roots, and even the still adherent prothallus absolutely undamaged, not one being thus sacrificed. Other pans are now prepared, not necessarily sterilized this time, but of fine open soil, and, again, an inch apart the now individualized youngsters are inserted, and will now in a greenhouse reach a size large enough to enable them to display their character, when of course selection can be made, the best and most promising being extracted, again an easy task, since if the soil be thoroughly wetted, they can be extracted by a gentle pull, leaving the rest undisturbed. By acting as above, it is an actual fact that no check whatever is suffered in growth, quite the contrary indeed, for in the case under consideration *Polystichums* sown last July have now, in October of this year, fronds three to four inches long with vigorous growth in progress. It may

be well to mention that in pricking out the rooted Ferns the soil should be only just moist enough to permit of holes being made to accommodate the roots, each plant being pressed gently firm with the finger as it is installed. The pan being filled in this way, it should be partly immersed in water until the water percolates from below to the surface and so saturates the soil, the operation is then completed. To prick out into wet soil does well



enough for the prothallus, but is not so good for rooted plants as the method indicated.

Now, as to the varietal results. Despite the difference of environment and individuality of the parents in both cases, the results of the second sowing are precisely as diverse as of the first, a considerable percentage of the young plants showing the same peculiar slenderness and length of the subdivisions as in the *Druery gracillimums*

and Green *plumosum*; so that a second and equally promising hatch of "gems" is practically secured. To give an idea of the wide diversity exhibited by the young plants, we have taken nature prints* of three fronds by way of illustration, No. 1 representing probable reversion toward the normal species, No. 2 a promising foliose form, and No. 3 an example of the true "gracillimum" or "plumosum" type, which invariably stands out very distinctly from the others by its acute and long divisions. It is noteworthy that owing to the precautions taken to ensure a pure sowing and protect from subsequent stray spores, only two strays (*cystopteris*) made their appearance in the whole batch.

C. T. D.

THE PEDIGREE OF ATHYRIUM F.F. KALOTHRIX.

BY DR. F. W. STANSFIELD.

The origin of this lovely fern is involved in some obscurity. The only facts certainly known are that, as a modern and living plant, it dates from 1870, when a Mr. Howlett, an amateur grower at Oxford, raised a plant, or plants, from the spores of a form of *A. f.f. plumosum* which was then growing in the Oxford Botanic Garden. Stimulated by this result Mr. Sim, Foots Cray, then a prominent nurseryman, obtained a division of the Oxford *plumosum* and also one of a *plumosum* raised by Mr. Howlett from the same source. From one of these plants (he was not sure which) Mr. Sim raised in 1874 a batch of some hundreds of seedlings of which ten or twelve per cent. were *kalothrix*, the rest being *plumose*, *subplumose*, and normal forms of *Athyrium f.f.* The oldest known ancestor of *kalothrix* was then this *plumosum* in the Oxford Botanic Garden. Col. Jones (from whose notes accompanying his nature-prints the above records are

* Simply with copying ink.

taken) states further that Mr. Baxter, the then curator at Oxford, wrote to him that the plant came from the Chelsea Botanical Gardens. There would seem to be some obscurity on this point, however, because it is stated that "it was for some time thought that the plumosum was an Irish form." Mr. Moore, of Chelsea, being referred to, said that *if* the plumosum came from Chelsea it must be a piece of the Horsfall plumosum, a crown of which had been sent thither by Messrs. Stansfield subsequently to its being exhibited for a certificate at South Kensington soon after its discovery—*i.e.* probably about 1861. Col. Jones goes on to remark very significantly: "It is strange, however, considering the very marked tendency, in the seedlings from the Oxford plant, to run in the kalothrix strain, that no similar trace of this strain should ever have been detected among the thousands of seedlings raised by Messrs. Stansfield and others from the Yorkshire plant." Strange indeed! so much so that it is, to me, quite incredible that the parent of kalothrix can have been the Horsfall plumosum.

What then of the tradition about an Irish form? Several plumosums have, I believe, been found in Ireland—one I know by the late Mr. Tyerman—but from none of them, so far as is known, has kalothrix ever been raised apart from this Oxford plant. *Apropos* of this, another fact which, though interesting, at first sight appears to have no particular bearing upon the question, is recorded by Col. Jones, to wit—"In the Sherardian herbarium, Oxford Botanic Gardens, is to be seen a wild frond, gathered many years since in the Mourne Mountains, almost identical with kalothrix." Now the Sherardian herbarium is the collection of dried plants made by Dr. Sherard, who founded the botanical professorship at Oxford, bequeathing by his will £3,000 for that purpose.

Sherard was born in 1659 and died in 1728, so that this specimen frond of kalothrix is probably at least 200 years old.

I recently made a pilgrimage to Oxford for the purpose of seeing this specimen and of gleaning any facts which could be found to throw light upon the history of *kalothrix*. Through the kindness of my friend, Mr. G. C. Druce, M.A., keeper of the herbarium, I was enabled to see the ferns in the herbarium and to examine the Mourne Mountains frond which is said to be "almost identical with *kalothrix*." The first point to be cleared up was whether this old frond was really *kalothrix* or only something more or less resembling it. At first sight it appears different from a cultivated plant of *kalothrix*, being proportionately narrower in outline and a little less dissected. The texture and marginal cutting are, however, exactly those of *kalothrix* and, upon reflection, it is just what one would expect a wild collected specimen of that form to be, and, indeed, it strongly resembles what I remember the first plants of *kalothrix*, sent out by Mr. Sim about 1875, to have been: *i.e.* it is smaller and less developed than modern cultivated specimens. The frond is gummed down on paper so that I was unable to determine whether any traces of fructification remained upon it. It must be remembered, however, that when fruit is found upon *kalothrix* it is generally in the form of irregularly scattered, often isolated and naked, sporangia, which upon ripening rapidly disappear, leaving little or no trace behind. Upon the sheet appears a note by John Ray:—"A most beautiful and distinct form which ought to have a separate name." (This is not signed by Ray but a sub-note states that it is Ray's handwriting). Now since Ray died in 1704 or 1705 it is clear that this frond must be more than 200 years old. Before leaving the herbarium it was noted that it contains many other abnormal forms besides *kalothrix*. *Polypodium v. Cambricum* and *Asplenium trichomanes incisum* were noticed, as also numerous forms of *Scolopendrium vulgare* including *crispum*, *multifidum*, *cristatum*, *ramo-cristatum*, *digitatum*, *polyschides* of Moore (named *angustatum*, by the way, a much better name than *polyschides* for this plant), margin-

atum and sagittatum. It is clear therefore that the study of varieties is not so exclusively modern as some of us have been apt to suppose.

Leaving the herbarium the next step was to see if possible the plumosum from which Howlett raised his kalothrix. Unfortunately no record could be found of this nor could any information be had about Mr. Howlett himself. There was, however, only one form of plumosum in the gardens (labelled simply *A. f.f. plumosum*). This was not the Horsfall plumosum, but was unmistakably the plumosum which comes from the spores of kalothrix and from which kalothrix can in turn be raised. It has some resemblance to the Horsfall form, but is a dwarfer plant, thinner in texture, less acute in the ultimate segments, and when exposed to the sun, as it was here, it burns to a peaty brown which is very characteristic and unmistakable. If this be, as seems probable, the plumosum from which Howlett raised his kalothrix it is at least equally probable that it was itself the offspring, immediate or remote, of another kalothrix. And if so of what kalothrix? Sherard's plant is the only one known to have existed previously. Everything, in fact, points to the Mourne Mountains plant as the ancestor of the modern kalothrix. It is clear, from the number of varieties in the herbarium, that Sherard was a student and admirer of these things. It is therefore extremely unlikely that, upon finding so good a thing as kalothrix, he would leave it behind in the Mourne Mountains and content himself with a dried frond. If he were the man I take him to have been he would transfer the whole plant alive to his vasculum and afterwards cultivate it carefully in his garden.

The comment of Ray, quoted above, is indirect evidence that kalothrix persisted as a living plant, for what would be the use of giving a new name to a fern of which only a dried frond was known to exist? Suppose now the fern to be growing in some snug sheltered place in Sherard's garden. We have seen that he left money to the University

of Oxford for the foundation of a botanical professorship, and that he also bequeathed his herbarium to the same seat of learning. What more natural than that his plants should also find their way, at or before his death, to the University Garden? Once there *kalothrix* may have scattered spores which gave rise to a *plumosum* and this would be much more likely to survive than would *kalothrix* itself. Or *kalothrix* may even have reverted wholly to the plumose form since it frequently does so partially even in modern times. This would agree with and explain the vague tradition of an Irish *plumosum*.

There are, of course, many missing links in the chain of evidence I have adduced and absolute proof of the descent of *kalothrix* from Sherard's plant is wanting, but the pedigree is probably as good as many in the Herald's College, and in any case this hypothetical descent must be considered to be more probable than the alternative theory that a fairly large batch of *kalothrix* sprang suddenly from a particular plant of the Horsfall or some other *plumosum*, no other individual of which has ever been known to produce it at all.

It is an interesting consideration that "perhaps the most delicately beautiful of all ferns," is also one of the oldest varieties whose origin can be traced, and it is an honour to the Emerald Isle to have given it birth as is to the Oxford Botanic Garden to have preserved it even in a disguised form during a century and a half of obscurity. Last, but not least, let us give honour to Sherard who discovered it. He ought to be the patron saint of fern-hunters.

NEW FERNS.

With the exception of the possibilities referred to in the preceding article, "A Successful Sowing," there is little to record since last issue. We have, however, received from Mr. J. Francis, one of our members, several fronds of a

peculiarly pretty crisped Oak Fern which had appeared in one of his sowings of that species. The fronds sent appear to be thoroughbred, but we have some doubts as to their true varietal character, since though no obvious disease or discoloration appears which may cause the curling by a check to normal development, there is associated with it a slight discoloration of the midribs. The fronds are freely fertile, and, with Mr. Francis's permission, a sowing has been made to test its constancy. If it stands the test, a possibility by no means precluded by the doubt felt, we should at last have a very pretty variant of this hitherto constant species. Some years back we recollect seeing some similar fronds of *P. calcareum* found in the Lake District, and as nothing more has been heard of this, we fear that that also might have been due to disease of a similar nature to that suspected in this case.

From an outside source, Mr. W. A. Barber of Backbarrow, some very fine fronds of scolopendrium were sent for naming, accompanied by a frond of a *Blechnum*, which appears to be an exact replica of our own *B. s. concinnum*, as it is very narrow and even, the lobes being like small scallop shells. This was found wild close to Backbarrow, near Windermere, by Mr. W. Lancaster in July last, and may therefore be legitimately reckoned as one of the best finds of the season.

From Mr. F. N. Adkin we have received fronds of some interesting seedling *P. aculeatums*, in which the fronds are narrow and crested, the peculiarity in each being that the pinnæ are ramose and almost fan-shaped, an indication we think of cruciate blood, though they cannot be termed cruciate. This feature is very thorough in each case. We have suggested the name of *P. aculeatum ramo-pinnatum angustatum* for the strain.

Mr. H. Stansfield, of Sale, reports the raising of a form of *A. f.f. excurrens* with inch long points, which he has named "spinosum."

A cruciate *P. aculeatum*. So far no cruciate form of *P.*

aculeatum has been found wild, but Mr. E. J. Lowe succeeded in infusing this character (in which the pinnæ or side divisions are in duplicate and set on at such angles as to form crosses with the opposite pairs, whence the name) into this species by a cross with a cruciate form of *P. angulare* known as Wakeleyanum, by which cross he was the first to practically demonstrate the possibility of hybridizing Ferns. The *aculeatum* parent, however, was not the normal form but a congested variety known as "*densum*," and the result in all the offspring has been somewhat congested or sub-imbricate types of an easily recognised character. We have, however, recently received from our member Mrs. Thatcher, a frond of *P. aculeatum* in her possession, which, while shewing the true normal *aculeatum* character throughout is markedly cruciate plus a well developed terminal crest. This plant she obtained as a seedling some twenty years ago from Dr. Fox, who was associated with Col. A. M. Jones, in the development of the wonderful Jones and Fox divisilobe plumosums of *angulare*, and Dr. Stansfield is of opinion that it is therefore one of the original hybrid offspring in question which has thrown off the *densum* character and while retaining the lucent leathery foliage and habit of *aculeatum* proper, owes its cruciate and crested character to Wakeleyanum of the other species. Despite the age of the plant, it has never produced an offset and is still a single crown. Spore sowings so far have failed, but as it is fairly fertile, another attempt is now being made, and if successful the progeny may throw some light on its genesis. In any case it is an extremely interesting plant.

From Mr. J. W. Tucker we have received fronds of a very curious *Scolopendrium*, of which the fronds for two-thirds of the normal length are normal but extra broad, they then, however, suddenly contract to form a narrow neck, whence springs a fanshaped thoroughly ramò-marginate crest of many narrow segments. We have named it *S. v. ramo-cristatum Tuckeri*.

LIST OF NEW MEMBERS.

- Mr. W. L. Salusbury-White, Llanwern Lodge, Leicester.
 „ Geo. S. Railton, Senior Council School, Tewkesbury.
 „ Robt. M. Mulligan, Holyrood, Co. Devon.
 „ E. J. Winslow, Lasell Seminary, Auburndale, Mass., U.S.A.
 „ J. W. Tucker, Ferncroft, Woodah Road, St. Thomas, Exeter.
 „ G. C. Lawson, Mayfield House, near Ashbourne, Derbyshire.
 „ W. T. Morrison, 23, Gowrie Street, Bridgend, Perth.

“**British Ferns and Their Varieties**,” by Charles T. Druery, V.M.H., F.L.S., with forty magnificent coloured plates, 319 wood cuts and other illustrations, and 96 monochrome reprints of a selection of the choicest varieties nature printed by the late Col. A. M. Jones of Clifton with his original notes *in extenso*. In cloth 7s. 6d. net; in half morocco, gilt, 10s. 6d. net.

It will interest the members to know that by the enterprise of Messrs. George Routledge & Sons, Ltd., the author has been enabled to realize one of the pet ambitions of his life, viz., the production, on practically untrammelled lines, of a thoroughly up-to-date and well illustrated record of our native ferns in their specific and varietal forms, together with such information as to their history, culture and biological peculiarities as will render the work a thorough compendium of knowledge for the amateur's reference plus indications of sources of knowledge valuable to those who take an interest on the scientific side. The addition of an appendix consisting of ninety-six of the choicest of the late Col. Jones' nature prints, accompanied by his contemporary notes, which the author has been kindly permitted by Miss Jones to use as a supplement, renders this book an absolutely unique one, apart from its comprehensive and practical character in other directions. Certainly no British Fern lover or Botanical Library should be without it as *the* standard work on the subject, and it would be an advantage to the author (the Editor of the Gazette and secretary of the British Pteridological Society) if orders for it were sent to him personally to his address as given elsewhere.

THE BOOK OF BRITISH FERNS.

This book constitutes an invaluable guide to the selection of the best forms for high-class collections. It was compiled by the Editor, with the assistance of a Committee of the British Pteridological Society, all experts, and contains descriptions of about 700 of the choicest forms, illustrated profusely, and accompanied by chapters on Fern Culture, Fern Hunting, and indeed all matters of interest in connection with the cult. It can be obtained from the Hon. Secretary and Editor, Mr. Chas. T. Druery, 11, Shaa Road, Acton, London, for 3s. 9d., post free, and may be regarded as absolutely indispensable to the real lover and grower of British Ferns and their varieties.

N.B.—As the covers of the few remaining copies in stock have become discoloured by damp, these will be supplied for 2s. 9d., post free, instead of 3s. 9d., the published price. Early application is advisable.

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POLYPODIUM VULGARE, AND VARIETIES.

THE BRITISH FERN GAZETTE.

VOL. I.

MARCH, 1911.

No. 7.

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EDITORIAL NOTES.

Despite the fact that we have been passing through the dull season for Fern culture, when little can be done to Ferns save the all-essential watering necessary under glass, but which is too often neglected, to their subsequent impoverishment or even death, the Editor has been favoured with some good contributions from members which will, doubtless, be interesting to their fellow Fern lovers, since there is always something to be learnt from the particular experiences of intelligent observers when carefully recorded. Mr. C. B. Green's interesting notes are concluded, and in this connection we may add that it is only necessary to see his plants to recognize his ability to give good advice as a very successful grower. With regard to a suggested Exchange Column, we would remind the members that it only rests with them to send us a note of their good material available for exchange, and their requirements, which will be published in the following issue for the benefit of their fellow Fern lovers.

As will be seen, new members are constantly coming in, but we must, nevertheless, beg those who have already joined to help us by inducing their Fern-loving friends to join, and thus, by swelling the list of subscribers, enable the Editor to increase the scope of the "Gazette" pictorially and otherwise. Specimen copies will be gladly sent to possible subscribers, and the annual fee (5s.) for membership and four quarterly issues of the "Gazette" is certainly moderate enough to suit all pockets. All MSS., etc., concerning the "Gazette" should be addressed to the Editor, 11, Shaa Road, Acton, London, W.

EDITOR.

OUR FRONTISPIECE.

POLYPODIUM VULGARE.

Our frontispiece in this issue gives a very vivid idea of the many beautiful and varied forms into which our common Polypody (*Polypodium vulgare*) has proved itself capable of sporting. The normal form is shown as No. 1 for comparison. All the specimens have been drawn either direct from actual fronds or from Colonel Jones' nature prints, and represent the following varieties:—

Fig. 1. *Polypodium vulgare* normal.

„ 2.	„	„	bifido-cristatum.
„ 3.	„	„	ramosum Hillman.
„ 4.	„	„	cristatum Scarborough.
„ 5.	„	„	cristatum (old form).
„ 6.	„	„	grandiceps Parker (multi- fido-cristatum).
„ 7.	„	„	„ Fox.
„ 8.	„	„	pulcherrimum.
„ 9.	„	„	cambricum. [mum).
„ 10.	„	„	cornubiense (elegantissi-
„ 11.	„	„	parvissimum. [biense.
„ 12.	„	„	bifido-cristatum X cornu-
„ 13.	„	„	omnilacerum (in proper form).

On page 34, No. 2 of the "Gazette," these and other varieties are described and cultural notes given for guidance.

C. T. D.

SPRING TREATMENT OF HARDY FERNS.

In this connection we would refer our readers to the article so headed which appeared in the March issue of 1910 (No. 3), since we have so much matter in hand for this issue as to be unable to find space for what would necessarily be a mere repetition or paraphrase. To members who have subsequently joined and not acquired the back numbers, we will willingly send a copy of that issue on receipt of a postcard.

C. T. D.

"MY FERNERY" (*continued*).

By MR. C. B. GREEN.

Continuing the Lady Ferns (*Athyrium Filix-fœmina*), there is also a *percristate* seedling with *grandiceps* cresting, which I regard with some favour. Unfortunately little is seen in the illustration* of these good things, while many others are quite outside the range of the lens. A neat and pretty *percristatum* found by Mr. Phillips ought to be mentioned.

Kalothrix and *K. foliosum* were acquired from another member of the B.P.S.—Mr. Wright—which fact serves to illustrate the good fellowship existing between those of the cult.

Victorias, of course, in various forms find a place here, and are well worthy of the room they occupy. The writer having treated of the Shield and Lady Ferns more or less *in extenso*, one's thoughts may now be diverted to the Male Ferns. As to the terms "male" and "female," or rather "lady," in this connection the novice is some-

* See Frontispiece last issue.

what prone to think that there is some sexual difference between them. Experts know better, these terms being merely descriptive of robustness in the one case, and fragility in the other. The Lady Ferns, therefore, by reason of their fragility, require shade and moisture, and protection too in towns, whereas the Male Ferns—*Lastreas*—on the other hand, will stand much more exposure and even droughty conditions, therefore the Male Ferns are poorly represented in my Fernery.

The *Filix mas.* section consists only of *linearis*, *fluctuosa*, and *f. cristata*; but the *pseudo mas.* group makes a better show. *L.p. mas. cristata* of course is there—it is in every fernery worth the name, for no fernist could be without the “King” of the group, with its symmetrical fronds, its beautiful tassels, and its tree-like habit.

Cristata angustata, as its name implies, has narrow fronds, is of smaller proportions, but otherwise resembles its parent pretty closely. *C. fimbriata* is dwarfer still, plumose in character and altogether more refined in appearance. *Polydactyla* Wills is another strong-growing fern one could scarcely ignore; it occupies a corner of the fernery, much to that corner’s advantage—I had almost said advertisement—for it has eight sturdy fronds which average over 4 ft. 6 in. long. These are broad in proportion, splendidly “fingered,” and at this season seem to produce spores so prodigally that I really believe there is enough to fill a lilliputian wheelbarrow! It is quite a regal fern compared with Dadd’s variety, which, by-the-bye, I think ought to be placed in the *Filix mas.* section, for its texture is much thinner and its fronds only partially evergreen.

Both these plants were tiny specimens in 1897, and were transferred from Mr. Druery’s fernery to mine. When I pause to reflect on these things I am conscious, not only of the flight of time, but of indebtedness to ferny friends.

Crispa and *C. cristata* ought to be mentioned as pot plants, they are almost too insignificant for the border, for there surely their dwarf and compressed crispy forms would

be entirely overlooked. These little gems, however, are fitting companions, pteridologically as well as sentimentally, for their pretty little "sisters" *Athyrium f. f. congestum minus* and *C. m. cristatum*.

Of the Broad Buckler Ferns (*Lastrea dilatata*) I can only mention *grandiceps*, *lepidota*, and *L. cristata*, and say that they are all worth growing. *L. æmula*, from Cornwall, and *L. æ. cristata*, from Devon, are rather "miffy" with me, while *L. montana* and its varieties are conspicuous by their absence.

In the opposite corner to Wills' polydactylous Male Fern I made a station for *Osmunda regalis* of peat and loam in about equal proportions, and to keep this vigorous-growing fern from trespassing on its neighbours, I thrust some stout slates two feet down into the border. Being also just behind the door, this, and its variety *cristata*, are always under observation, and therefore do not get neglected in the matter of that all-important fluid, without which no *Osmunda* could long survive. That the conditions conform to its natural requirements is evidenced by its vigour, for the fronds are not only numerous, but attain the height of seven feet, and many of them are now (October) still surmounted with their brown flower-like scapes. I got this from Studland Bay, in Dorset, 1895, where I have recently been, and am glad to report its continued existence in that district. Its beautiful variety *cristata*, which occupies a front place, is comparatively dwarf in habit, and affords a striking contrast to its towering parent, a contrast which the veriest tyro in fern matters can understand and appreciate. Still looking up, one's eye is sure to be attracted to the *Polypodies*, or, as they call them in Cornwall, "Ladder Ferns." These seem particularly suited to the hanging basket, and at least four out of six of these wire receptacles I employ for *Polypodies*. The hanging basket, however, is peculiarly liable to suffer from drought, as when watered ninety-nine per cent. is apt to run through. This can be

obviated by soaking basket and plants in a bath of water, say, once a week. A pulley is in requisition for this purpose—thus the required immersion can be nicely regulated. I may here point out that a well-furnished basket of ferns is an artistic addition to any fernery. Unfortunately the illustration (Frontispiece, December "British Fern Gazette") only shows the bases of three such adornments. As to the contents, they comprise most of the *élite*, and a fair form or two may be considered. *Polypodium vulgare cambricum* is a good, if not rare thing, and a basket or a pan full of its creeping rhizomes, with their accompanying "plumes," forms an ornamental foliage plant of no common kind. Another variety, but of Cornish origin, viz. *cornubiense*, or *elegantissimum*, is worthy of a place, and although it is somewhat erratic in frond division, it is an interesting example of the mutability of species.

Prestonii is an improved and denser form of *cambricum*, and *grandiceps* (Parker) is a curious conglomeration of crispy crests. There are several bifid varieties, and one *acutum* form, which I keep as a souvenir from the Great Orme's Head, 1894, and yet another, which Dr. Stansfield has described as "curious and interesting," a form I found near Dolgelly in 1901. This form, which is somewhat inconstant, has short rounded lobes, after the fashion of a *Ceterach*, and when in character is an improvement on Mr. Phillips' *rotundatum*. Then we have two other species of this genus—*Polypodium Phegopteris* (Beech Fern) and *P. Dryopteris* (Oak Fern). Notwithstanding their fanciful names, botanic and vulgar—the one, in fact, is a translation of the other—they are useful little ferns, and revel in shade and moisture. A slight variety of the former, with tiny furcate tips, was, I think, found by Mr. Whitwell. Anyhow it has found a home on my rockery, and always comes true in the matter of these small dilations. Otherwise it is of no value as a variety, but in association with the Oak Fern—in colour the

“sweetest” of all green things—it affords a pleasing contrast. The latter is not only colour-perfect, but exquisite in form also.

We now come to the Hart’s-tongue, undoubtedly the most variable of all Ferns, but the configuration of many of our varieties is no more like the tongue of a hart, or any other animal, than a cow is like a cucumber! And this has all been brought about by variation. What a contrast, then, between, say, Kelway’s tiny *densum* and the magnificent frills of Wills’ *Crispum grande*! And what a host of intermediates!

Starting at the very bottom in point of size, this little *densum* is a mass of mossy growths, each tiny division dividing again and again until finality is reached, and a plant is produced which rather resembles a moss than a Fern. This little gem requires rather close treatment, otherwise it would not develop those wonderful marginal bulbs by which it can be easily propagated. Another remarkable variety is Barnes’ *dimorphum*, which bears two kinds of fronds, and thus varies from nearly normal to linear fronds, each with flat spreading handsome crests. I confess I was sceptical when I first saw this Fern in MR. DRUERY’S collection, but now I have “nae doots” about it, as I have experimented with it and proved its dimorphic character. *Cristatum* proper, in many forms, is a good variety, while *c. Barraud* carries the cresting much further, and *C. viviparum* (O’Kelly) is proliferous as well. Then we have in the *sagittate* forms some very good things in conjunction with other characters, and culminating, perhaps, in *grandiceps*. The *capitate* forms—of which *grandiceps* is one—are all worth growing, and in this connection I must mention one I am pleased to call *capitatum* Green, which is generally regarded with some favour. There are many others—*laceratum*, *spirale*, *muricatum*, *ramosum*, *ramosissimum* Green—of course every specialist has his fancies—*peraferens*, *tri-peraferens*, and so on almost *ad infinitum*. But I think it will be conceded that *the* most lovely departure from the normal form

is the *crispum* section. And yet there is a good deal of "normality"—at least in outline—about them. The tongue-shape is more or less retained, but the flutings, frills, or convolutions of their margins render them very distinct.

Referring once more to the illustration of "My Fernery," it will not be difficult to pick out one of the best of this section—*crispum grande* Wills, already touched upon. Here we have form, size, symmetry, and beauty, let alone *distinctness*. Of other *crispums*, too, there are many. *Crispum* Grey is the type; and thence upward to Robinson, Stabler, Stansfield, Drummondæ, etc., etc. These again take on crests, imbrications, fimbriations and even aposporous growths, so there is no end to choose from and cultivate. They are especially adapted for frame culture or small houses, and therefore there is no reason why we should not become a Bolton, a Cropper, or a Stansfield. On the shelves are a few Spleenworts, the best of which is *Asplenium Trichomanes* var. *incisum*, a lovely plumose form of the species, with fronds deeply cut and quite barren. This plant has occupied the same 4½-inch pot for several years, the compost being loam, peat and old mortar. That it is doing satisfactorily is, I think, evidenced by the number and condition of the fronds—between fifty and sixty. These particulars are not given in any ostentatious spirit in this case—or in the others quoted—but merely as a measure of the plant's capacity under certain conditions. As a matter of fact, in some other cases I have to admit failure, for the Spleenworts are not to be lightly undertaken in the matter of culture. *Asp. t. cristatum* and *crenatum* are not far removed from the normal form. Their names imply their characteristics.

In 1902, I found both at Lynton, and photographed the latter *in situ*. This was not a particularly easy task, as a good deal of climbing had to be compassed, and some nasty projections negotiated. However, it is a good thing it was accomplished, as *that* is the only record I now possess. Therefore, in conjunction with the above passage, this is a

serious set-off against a chronicle of success. Doubtless my little plants pined for their native air, at any rate they refused to respond to my blandishments. A very good reproduction of this little fern may be found on page 89 of "The Book of British Ferns."

A very closely allied Fern—the Rusty-back Fern, or scaly Spleenwort—(*Asplenium Ceterach* or *C. officinarum*) does very well next door, so to speak, to the beautiful *incisum*.

I have two specimens in similar sized pots, one from Monmouthshire and one from Middlesex, and but for the labels I could not distinguish between them. That this fern has a Middlesex habitat is, I hope and believe, known to very few. These plants are potted in similar compost to the *plumose spleenwort*, with a liberal addition of limestone chips.

Of all the Ferns I am acquainted with, my fancy goes to the true British Maidenhair (*Adiantum Capillus-veneris*) and its varieties. I am particularly partial to one known as *imbricatum*, a name sufficiently indicative of its overlapping pinnæ, and more or less plumose character.

It appeals to me further, because I have two or three interesting plants which were raised from spores ten years ago.

Oh! how the time flies! The fact that this Fern sometimes produces *sori* was emphasized in 1899, when a correspondence was being conducted in *The Gardeners' Chronicle*, concerning its non-fertility. Mr. Druery maintained the contrary—and Mr. Druery was right. The results on my rockery are proofs positive of its fertile character, and although the summer growths are sometimes marred by winter's chills it still persists. As a matter of fact, all the Maidenairs require a warmer temperature than a cold house affords.

This Fern is particularly responsive to a little heat—hence, I have come across it once or twice in good condition in warm greenhouses.

I have also in association with this a slight variety from

the "blue lias limestone cliffs" of Southerndown, in Glamorganshire, kindly sent me by Mr. Gething, of Abergavenny, in 1902, with a statement that this habitat has been his own for sixty years. But this Fern does not grow so vigorously as my *imbricatum*. Since then I have visited St. Ives, in Cornwall, with the result that my rockery is further adorned with the species from the sea-cliffs in that neighbourhood.

Again, I possess on the rockery a sturdy *self-sown* form of this beautiful Fern, which I think is rather remarkable, the conditions being understood.

The Killarney Fern (*Trichomanes radicans*) and the two Filmy Ferns (*Hymenophyllum tunbridgense* and *H. unilaterale*), all from Scotland, occupy a case to themselves, and can only be mentioned here to complete the series.

I had intended to touch upon cultural matters—ventilation, watering, and manipulation generally—but, no; I have said enough; and will conclude with a hope that if self has been rather prominent in this article, it will be pardoned as inevitable in a description of "My Fernery."

MYSTERIOUS FERNS.

Probably there is no thorough-going Fern cultivator of long standing, but has had curious experiences amongst his sowings of fern spores, quite apart from those "strays" which are almost inevitable when spores are collected late in the season, at a time when other spores have been shed broadcast and become as a consequence mixed with those which he takes direct from the frond. In our own experience several occurrences have been so inexplicable, so impossible to attribute to strays of this kind, as to merit record. Of these the most marked instance occurred comparatively recently. In a hedge near Seaton Junction, Devon, we found in 1908 a very remarkable *Polystichum angulare*, bearing only two large fronds, each of which was of abnormally tough texture and with a shining surface, while the fronds were thric

divided instead of being merely bipinnate. All the pinnae half-way up the frond were truncate, ending squarely, with the midrib projecting as a small translucent thorn, and the top of the one complete frond (that of the other was broken off) was truncate also with a similar projection. On digging this plant up, we found to our intense surprise that the remains of five or six fronds of the previous season were still attached, and sufficiently intact to show that they were absolutely of the common normal type without a trace of the three abnormal characters, lucent surface, tripinnation, and truncation, visible. The fronds bore spores profusely, and despite the obvious inconstancy we determined to sow some, in the hope that at any rate a few plants of the new and very uncommon form would result. We therefore severed a pinna (a truncate one for preference), laid it on a glass slip, and shortly after, examining it with the microscope, discovered a good batch of shed spores. These we sowed in the usual way, first sterilizing the soil and also, as is our custom, sowed them in one of our dwelling rooms and then covered them close with glass. Subsequently a minute patch of an incised *Asp. trichomanes* from Mr. Moly's collection, was sown with them.

The first results of the sowing, when the plants declared themselves, was a dense forest of *Lastrea filix mas*, many of which showed signs of cresting, and none of which struck us as normal. These grew so robustly as to give no chance to the *Polystichum* we hoped for, and hence as they presented no promising features, they were all cut out with a pair of sharp scissors. It was then seen that beneath them were a few plants of *Asp. t.* of the incised type of Mr. Moley's plants, and only here and there a *Polystichum* seedling, while one or two crested Lady Ferns and as many *crispate lastreas* had obviously, despite our precautions, resulted from strays. These *Polystichums*, only some half-dozen in all, instead of developing the truncate and composite character of the presumed parental frond, all produced

branched and crested ones, such as no fern in our collection resembled, and of so marked a character that it is almost impossible to impute them to the Seaton Junction find, which, if innocent of these, practically produced no progeny at all. Now, two peculiar points about this case are (1) that the *Polystichums* rarely, we might almost say never, give rise to stray plants among our sowings; and (2) that the few which did appear behaved alike, with one exception, apparently normal. The possibility has been advanced that they arose from stray *Polystichum* spores deposited at Mr. Moly's on the frond of *Asp. trichomanes* in question, but so small a portion of that frond was used that such an explanation is hardly feasible, and moreover Mr. Cranfield, who sowed from it, also obtained no such results. The origin, therefore, of these *ramo-cristate Polystichums* is an entire mystery, as was also that of the first batch of *Lastreas*, as being more or less abnormal, they can hardly be imputed to stray spores from adjacent plants in the hedgerow concerned.

We have sown spores now some hundreds of times, but never had such a puzzling multifold result before. Unexpected things, however, have occurred on several other occasions. In 1900 we received a plant of *P. vulgare serratum* from Kew, with deep saw-toothed pinnæ, one of which we noticed was irregularly and curiously branched. As this bore spores we sowed it, without result. In 1905, however, we noticed a small seedling *P. vulgare* in a pot of other spores sown the year previous, and on its primary fronds we discovered prothalli, *i.e.* apospory, for the first time in that species. We consequently carefully isolated it, brought it on, and lo! it proved to be an exact replica of the Kew *serratum* sown so many years previously in another pot entirely.

Another case. In 1838 we sowed together for a cross *A. f. f. Kalothrix* and *A. f. f. Cousensii* (*Pereristatum*), with the result that we obtained the latter form with much elongated pinnules, which we attributed to *Kalothrix* influence, but

there were no signs of a crested *Kalothrix* proper. About fifteen years afterwards we made a sowing of *A. f. f. Plumosum superbum*, which practically failed, producing only a few strays of no value. These remained in the thimble pot in which the spores were sown, until one day we were about to throw the contents away, when on the very edge of the pot a curious looking patch of apparent moss was noted, and examining this with a lens, we found it consisted of a bunch of tiny ferns delicately cut and shining like *Kalothrix*. Removing it and bringing it on it revealed itself as no less than seven plants of a true *Kalothrix cristatum*, all springing from one *prothallus*, and six of these, after a surgical operation, survived. It will be noted that the cross sowing was made about fifteen years previously, the results being now large established plants, and that this "sport" (? cross) arose in a sowing of a different type entirely, and was raised in a Wardian case after the usual precautions had been taken to ensure a pure sowing, though, as we have seen, these were vain. One assumption is feasible here, and that is that one plant of the originally attempted cross, which we have described, was really a success as regards the blending of bloods, and that one of its spores yielded as a stray this obvious blend on the desired lines, to use a colloquialism, a most decided "flake," as an intentional sowing from the possible parent only yielded the parental form. Mr. Whitwell's batch of dwarf-crested *L. propinqua* may be quoted among similar mysteries, since a number of these, all alike, turned up in a sowing of *Blechnum spicant*, and there is no form of *L. propinqua* to which their parentage can reasonably be imputed.

Among apparent mysteries which, however, found a solution, may be mentioned the case of *Lastrea œmula cristata*, found many years ago as a wild plant in Devon by Mr. Gill. The original plant was lost, but, happily, a single seedling came up in the pot. Colonel A. M. Jones acquired a fertile frond of this, part of which he sent to us. Both of us sowed at once. Colonel Jones obtained

an abundant crop of exotic *Pteris serrulata* and others, and we obtained a little forest of Lady Ferns. These we eliminated as they declared themselves by means of a fine-pointed pair of scissors. A second crop followed, and were treated the same. By this time, however, it was evident that the Lady Ferns were exhausted, for the pan then yielded about 300 true seedlings of *L. œmula cristata*, most of which went to Colonel Jones, as, assuming his sowing to be a failure, the *Pteris* family was not removed, and the *L. œmula* were consequently crowded out. Now, the fertile frond used was taken from a fernery full of British Ferns, and hence, undoubtedly, was laden also with stray spores, which produced the two crops of Lady Ferns, owing to their more rapid germination and development, before the *œmulas* had a chance of asserting themselves. Colonel Jones placed his sowing in a warm greenhouse, and here, it is obvious, the adjacent *Pteris* plants profited by the opportunity, and, owing to the warmth, gained the upper hand over both the Britishers. This explanation involves a warning against sowing spores together of species of different speeds of development and robuster growth, since the weaker is bound thereby to go to the wall when the earlier prothalli monopolize the space and starve out the later ones, a point to remember in sowing, as some fern spores yield prothalli very rapidly and others very slowly.

C. T. D.

AN APOSPOROUS POLYSTICHUM.

I herewith send you photographs (back and front view) of a promising seedling, *P. angulare*, raised by my brother, Mr. H. Stansfield, of Sale, and kindly sent by him to me. It is of *pulcherrimum* type, and bears upon the tips of the ultimate segments small prothalli, which are visible in the photograph. Its parentage is obscure, as it appeared singly in a batch of mixed seedlings. A seedling of

similar character was raised at the same place some years ago, but it eventually dropped the *pulcherrimum* character, as so many wild finds have done before it, and reverted to the normal type, or nearly so. The "new baby" at present



has some resemblance to a young plant of the splendid, but now, I fear, lost, *pulcherrimum* of Wills. I am looking forward to the new fronds with mingled feelings of hope and anxiety.

F. W. STANSFIELD.

VARIEGATED HARTSTONGUES.

Your article in the recent number of the "British Fern Gazette" prompts me to add my experience on this subject. Five or six years ago I secured a division of a variegated *crispum*—a wild find, originally, in North Devon—that had to my knowledge been constant for some three or four years. The cultural conditions and habitat of the fern in question previous to my securing a division were all that could be desired—the soil and environment ideal for fern life.

At the present time the plant in question is in a border under a north wall, one of many other well-grown *Scolopendriums* characteristic of the best in that section. Previous to this year the fronds have all been of the type of the narrow one accompanying this note, in some seasons not quite so restricted in growth, perhaps, but always of the same pale yellow, or almost white, colour. This year, however, a few only of the fronds have shown that marked characteristic, whilst others have assumed the almost normal growth of an ordinary frilled Hartstongue, as per frond submitted. Close examination, however, reveals distinct traces of variegation permeating the green. The more vigorous growth and almost normal green of the later fronds can be accounted for, I think, by the fact that for the past two months the ferns at the extreme base of the border have been heavily shaded, and the light partially obscured, by a row of chrysanthemums in 12-inch pots. The narrow variegated fronds are those which were exposed in the early summer to the full light and the little morning sun that reached them; the wider fronds, those matured with an entire absence of sun and the obviously more moist conditions.

I am sending you at the same time two characteristic fronds of another *Scolopendrium*, located in the same border, bearing very pronounced traces of variegation. The fronds sent are typical of the entire plant, and each year show no reversion to the normal type. This fern, though not one

of the most robust-growing kinds, is apparently in perfect health. That variegation can be temporarily brought about by unnatural conditions is obvious, but the plant, with a more liberal treatment and normal conditions, soon grows out of it.

The cause of variegation in plants is a very debatable and obscure subject, but that constant forms of variegated Hartstongues exist is, I think, beyond doubt, although, perhaps, good forms are rare. To perpetuate and still more markedly develop this trait may be possible, and opens up an interesting vista to the fern enthusiast; but there is another side to the picture. A short time ago I was induced to submit a selection of choice fronds to a meeting of members of a College Field Club, and the Principal, in introducing them to the notice of the members present, characterized them as freaks of fern life. I need scarcely say it was anything but pleasing to find the beautiful specimens shown dubbed as freaks. To me they were types much more highly evolved than their forbears; but I am afraid that variegated ferns might well merit that term, because, apart from being a distinct break from the normal, variegation is not a very desirable characteristic, and would give the uninitiated the impression that the plant was in the first stages of dissolution. Nevertheless, it is a very interesting subject, and I may mention that the two ferns in question have been singled out and evoked comment from friends examining my collection.

J. W. TUCKER.

Ferncroft,
St. Thomas, Exeter.

SOME ADVENTURES OF A NOVICE.

By FRANCIS W. THORRINGTON.

Occasionally I wonder whether any other member of the British Pteridological Society happens to have encountered quite the same set of difficulties as mine. Imagine a

garden plot of about half an acre (50 by 500 feet), open, wind-swept, and sunny, the only fencing being posts and wire. The small "lean-to" was carefully placed by the builder against the west wall of the house, hence it is shady and cold each morning, sunny and hot each afternoon throughout the summer. However, a good-sized tree of *Prunus Pissardi* that I planted to give shade to the greenhouse is now beginning to be useful to the ferns inside.

Out-of-doors the first consideration has been, and still is, a determined fight against such foes as couch-grass, creeping-thistle, convolvulus, coltsfoot, sow-thistles, etc., to say nothing of a multitude of annual weeds. Quite frequently I have cleaned banks and borders, planted them with young ferns, and found all my care defied by a strong encroachment of these weed marauders from over my frontier. Moreover, besides weeds, I have been indebted to neighbourly attentions from cats, dogs, poultry, pigeons, and even pigs. At the end of my plot some oak trees throw their leaves, and, deeming the resultant leaf-mould good, I planted banks of ferns in their shade. Imagine my joy when, returning home from a visit last Christmas, I discovered most of my ferns uprooted, and learned that two pigs had been diligently grubbing for acorns during my absence.

I am gradually overcoming the weeds by cutting out deep paths. This results in what is sometimes known as a "Devonshire lane"—a bank of soil each side of the sunken path, on which ferns, etc. may be established.

The battle against drought is ever with me, and, in addition to the more usual methods, such as placing stones around each plant, I have tried a plan which I venture to recommend to our members' attention, in case they have not already used it. There is a dwarf-growing "carpeting" plant, known as the Corsican Nettle Moss (*Helxine Soleirolii* [Corsica]). This keeps a bright green mat around the crowns of the ferns, and greatly conserves the moisture available. The first severe frosts blacken the foliage of

this plant, which is not perfectly hardy, but around and under the fern fronds, and nestling in the lee of every stone, it maintains its verdurous appearance, and with the first warm spring days commences rapidly to spread again from these shelters. It thus appears to have somewhat of frost-protecting value for the fern crowns, besides its summer function as a moisture retainer.

At first sight it might seem that the *Helxine* would harbour slugs, yet I have seldom seen many on it, and those were easily caught on its close carpeting leafage. Altogether, I fancy the plant is well worth experimenting with, and I hope I shall induce a few of the Society's membership to criticise my results.

The fern cult first captured me when I was living at Rochester, Kent, about 1898. I gradually acquired a selection of hardy and semi-hardy exotics, such as *Adiantum pedatum*, *Woodwardia radicans*, *Onoclea sensibilis*, *Cyrtomium falcatum*, *Asp. bulbiferum*, and a number of *Pterises*. Several of these plants I still possess and cherish.

I don't know whether it is treasonable on the part of a member of the British Pteridological Society, but I still feel that *Adiantum pedatum*, at its best, is "a gem of the first water." The multitude of plantlets on *Asp. bulbiferum* was what first drew me towards British ferns, as it caused me to take great delight in a proliferous Shield Fern I came across. It was a very ordinary "proliferum," not by any means equal to *acutilobum prol. elegans*. I raised numbers of these bulbils, and hold strongly the opinion that as a means of attracting fern lovers, and inducing them to "try their hands" at easy methods of propagation, the most freely proliferous of our soft Shield Ferns are hard to beat. It is not every day that one comes across the enthusiast—the person who eventually boasts a collection of choice things, and joys in our membership. Such people are rare, and for every one of them I believe there can be found scores of ordinary "fern lovers," of the type that

patronize the hawkers, who are doing their best (or worst) to denude our ferny counties of their treasure. Let such people once realize how easily they can secure a stock of these fine evergreen ferns by such simple bulbil growth, and we have almost succeeded in shutting their doors in the face of "the man with sack and trowel."

In my own evolution, the next stage was an attempt to grow a piece of Bracken rhizome, taken up one April and planted on a shelf in my greenhouse. This grew rapidly, and actually pushed behind the shelf, crawled down the wall until it bridged the three-feet gap, reached the ground, and burrowed into it. Evidently the shallow soil of the shelf provoked it to this great effort. Since then I have had a great respect for the vigour and resource of our commonest fern.

A relative then sent me a tiny frond of a fern, and asked me to name it. It had been grown in a living-room, and much ill-treated, so, in those early days of my fern love, it is scarcely surprising that I was baffled. Later on, however, I was given a division of the plant. In the greenhouse it speedily developed evergreen fronds, at least twelve times the size of the piece I was desired to name. When the happy day arrived, on which my wife "spotted" on a second-hand bookstall a copy of Mr. Druery's first book, "Choice British Ferns," I discovered from the plates that I possessed a specimen of the Welsh Polypody.

Next came my attendance at one of Mr. Druery's lectures to the National Amateur Gardeners' Association. This was a revelation. I made the acquaintance there of both Mr. Druery and Mr. Green, and left the Hall an absolute convert to the British Fern cult. Much of my subsequent enjoyment has been due to several kindly gifts of plants, bulbils, and spores from Messrs. Druery, Green, and Whitwell.

My only wild "discovery," if it can be so styled, was a bracken seedling that appeared on some peat from an Essex common. It proved to be a nicely crested form,

and, I fancy, must have arisen from a merely "bifid" parent, as repeated subsequent search all over the common has disclosed nothing but the veriest "tips" as an approach to cristation. This year I have raised a batch of youngsters from my seedling. Amongst them I have, I believe, a percentage of grandiceps, though whether they are big enough to survive the winter remains to be seen. This autumn I also collected spores on the same common from fronds which showed most approach to a "crispa" character, and I now have a pan of prothallus from these, though I fear the variation was too slight to yield me any results of interest.

Although my total of varieties would doubtless appear very small to most of our members, yet I find I am regarded by gardening acquaintances as quite a fern specialist. Doubtless, indeed, it is a surprise to the uninitiated to see even my few plants. I cannot boast the plumose *Polystichums*, etc., the "sissimum" types as Mr. Green calls them, yet I have such gems as *A. f. fœmina Plumosum Drueryi*; several fine crested *Athyriums*, and one narrow, almost *Frizellæ* one; the "King of Male Ferns"; and also *L. p. mas crispa* and *L. dilatata grandiceps*. Then come those fine *divisilobe Polystichums*, *longipinnatum*, *stipulatum* (*Carbonell*), *perfectum* (*Jones*), *Holeanæ*, and several fine "proliferums"; *Polypodium v. Cambricum*, *P. v. grandiceps* (*Fox*), *pulcherrimum*, and *elegantissimo-multifidum*; a number of beautiful *Harts-tongues*, and last, but not least, that yearly delight *Osmunda regalis cristata*.

The majority of these (the last-mentioned is a notable exception, though) do far better with me when planted in the open than under glass, as, owing to west facing of my greenhouse, they get such a scorching on summer afternoons. However, no discouragement can damp one's enthusiasm in face of so much exquisite frondage. I am well content to go on cultivating, in the hope that one day I shall create the 'fern fever' in someone else locally.

My "adventures in Fernland" have been pregnant with interest to me. I trust this halting narration of them has not been of too 'boring' a nature. A hearty farewell greeting to all the fellow-adventurers in our delightful branch of gardening.

OUR WONDERFUL NATIVE FERNS.

Considering the fact that in many parts of the world ferns grow on a much more luxuriant scale than they do in the British Isles, the conditions of warmth and humidity being such as to encourage greater development, and bearing in mind that we can only claim about forty-four species belonging to seventeen genera, while some tropical and sub-tropical islands reckon these by the hundred and by the score, respectively, it may be asked in what special respect can the term "wonderful" be applied? The answer to this question may be given succinctly enough, viz. that although we have only forty-four species these species have "sported" to such an extraordinary extent that at least two thousand distinct varieties can be definitely described and catalogued, while five thousand would probably not be an over-estimate of forms which an expert could determine as distinct. A very large number of these "sports" are far and away more beautiful than the normal forms whence they have, in some inscrutable fashion, originated, so that while for our normal specific forms, pretty as many of them are, it cannot be claimed that they equal in beauty some of the finest exotics, their varietal types in many instances can hold their own with the best of those, while in diversity of type, within specific or even generic limits, the exotic ferns are utterly eclipsed by several of the British species.

It is, indeed, one of the peculiar wonders in this connection that sports have been found wherein the specific type has been modified on lines of which not even a trace has so far been found in exotics, while it may safely be

stated that so far as sports found under wild conditions are numerically concerned, our forty odd species have yielded more than all the hundreds of genera and thousands of species of the rest of the world combined. Our term of "wonderful" is therefore seen to be well justified; since, however, it is difficult to believe that there is anything in the climate, soil, or general plant environments of Great Britain which does not obtain elsewhere in the world, and to which may be attributed an extra sportive tendency in the ferns, and since, moreover, the writer in his travels has been successful by assiduous search in finding fern varieties elsewhere, it is to be assumed that the peculiar richness of our British varietal collections is mainly, if not entirely, due to the fact that the search for such varieties has formed an uniquely British hobby for more than half a century. A few marked forms having been then discovered in our fern districts of Devon, Somerset, Dorset and Cornwall, and elsewhere, these attracted attention and started a cult which was eventually earnestly pursued by an increasing coterie of fern fanciers, with the result that their research was rewarded every now and again by the acquisition of new and unexpected types.

The "cult" was still further encouraged when experience demonstrated that these "sports" not only as a rule reproduced themselves truly and constantly from their spores, but every now and again would yield typical progeny on still more marked lines, so that selective culture led to great improvement.

It may give some idea of the success attending persevering search for these new forms among the common types of the hedge, ditch, old wall, stone dyke or shady glen, when it is recorded that one of the original pioneers, Mr. J. Moly, in Dorset, found 600 distinct varieties within his own district, while his near neighbour, Dr. Wills, also found a large number, no two of which, it may be remarked, were identical in form. Eventually

fern hunters were to be found in every part of the country where ferns prevailed, so that by their joint labours England, Wales, Scotland, Ireland and even the Channel Islands, one and all, contributed their quotas to the ever-increasing list.

We are, therefore, inclined to attribute to this peculiar hobby, rather than to anything else, the existence in this country of such magnificent collections as we find in Kew Gardens, and here and there in private hands. The search for abnormal forms of this kind involves a peculiar concentration of attention which, in our opinion, stands in the way of success of the all-round botanist. Nothing less than the examination of every individual fern within sight will suffice. The "sport" may only betray itself by the tip of a frond amid a jungle of common ones, and as a rule it is a solitary example, since they rarely multiply to any extent *in situ*; or it may be but a small seedling, or a dwarf sport, in all or any of which cases it is very liable to be overlooked and the opportunity missed. The botanist proper cannot refrain from noting other plants as he proceeds, and that is fatal to fern-hunting success. It is due to this reason we imagine that comparatively so few wild exotic sports are recorded; furthermore, the conditions of fern hunting in tropical and sub-tropical countries are different, the very abundance of the species and the luxuriance of growth handicaps the varietal fern hunter, who otherwise we feel convinced, could endow our Exotic Fern collections with beautifully tasselled or plumose Tree Ferns, etc., on the lines of some of our British gems of that ilk.

CHARLES T. DRUERY.

(*To be continued.*)

LIST OF NEW MEMBERS.

Mr. R. M. Milligan, Holywood, co. Down (correction of last issue).
Mr. W. Watson, Curator, Royal Gardens, Kew.
Mrs. Anne C. C. Winsor, Adderley Rectory, Market Drayton.
Lady Dorrington, Lypiatt Park, Stroud, Glos.
Sir Alfred Apperley, Rodborough Court, Stroud, Glos.
Mr. Philip Dowell, Port Richmond, New York, U.S. America.
Mrs. Stanley Powell, "Dorcas," Stapleford, Crawley, Sussex.

NEW FERNS.

From Sir Archibald Buchan Hepburn we have received fronds and sketches of a very fine form of *Hartstongue* found in Wigtonshire, Scotland, on an old wall in association with numerous normals, and under conditions which stamp it as an absolutely wild sport. It bears broad foliose ramo-cristate fronds on very bold lines, and apart from its handsome character is, we believe, unique as a wild variety of that species recorded in Scotland, where it is rare, only occurring, we believe, at a few places on the west coast. It would interest us to hear of others. We have ourselves found it near Wigton, on the Cree estuary.

Polypodium vulgare (? var.). From Mr. W. Richter Roberts we have received a frond from a plant found by him last year on a dry hedge bank near Barnstaple. As a small plant it appears to be a replica of *P. v. cornubiense*, but as it requires trial, we merely mention it now, and will recur to it later on.

"**British Ferns and Their Varieties,**" by Charles T. Druery, V.M.H., F.L.S., with forty magnificent coloured plates, 319 wood cuts and other illustrations, and 96 monochrome reprints of a selection of the choicest varieties, nature printed, by the late Col. A. M. Jones of Clifton, with his original notes *in extenso*. In cloth 7s. 6d. net; in half morocco, gilt, ros. 6d. net.

It will interest the members to know that by the enterprise of Messrs. George Routledge & Sons, Ltd., the author has been enabled to realize one of the pet ambitions of his life, viz. the production, on practically untrammelled lines, of a thoroughly up-to-date and well illustrated record of our native ferns in their specific and varietal forms, together with such information as to their history, culture and biological peculiarities as will render the work a thorough compendium of knowledge for the amateur's reference plus indications of sources of knowledge valuable to those who take an interest on the scientific side. The addition of an appendix consisting of ninety-six of the choicest of the late Colonel Jones' nature prints, accompanied by his contemporary notes, which the author has been kindly permitted by Miss Jones to use as a supplement, renders this book an absolutely unique one, apart from its comprehensive and practical character in other directions. Certainly no British Fern lover or Botanical Library should be without it as the standard work on the subject, and it would be an advantage to the author (the Editor of the *Gazette and Secretary of the British Pteridological Society*) if orders for it were sent to him personally to 11, Shaa Road, Acton, W.

== FERNS. ==



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EDITORIAL NOTES.

In the first place we would call the particular attention of our members to the forthcoming August Meeting, of which particulars follow, and trust that the appeal will bear good fruit. We would also appeal to them to do their utmost to increase the membership by mentioning the Society to all of their friends who take an interest in our native ferns. As will be seen in this number we increase the number of illustrations, and it is our ambition to also increase the number of pages and consequent information, but to this end it is essential that more subscriptions should be obtained to cover the inevitably increased outlay. We have made wonderful progress since the "Gazette" was started, which has won golden opinions from competent critics both here and abroad, as our foreign members indicate, as a recognized "expert" publication, and yet adapted to

every amateur. The subscription of 5s. per annum (August to August), entitling to four issues of the "Gazette" and bringing more and more numerous fern lovers into immediate touch with each other, is surely moderate enough. The Editor will be delighted to send a specimen copy of the "Gazette" to anyone contemplating joining. His address is 11, Shaa Road, Acton, London, W., to which all MS. and other communications should be directed.

OUR FRONTISPIECE.

POLYPODIUM V. OMNILACERUM.

This fine old variety has been so rarely seen in character of late years that its occurrence deserves to be recorded. I recently came across it in splendid condition at Oxford. The photograph sent herewith exhibits it in its best form. The acutely pointed pinnules are well shown, as also the finely serrulate margins. The extreme depth and leafiness of the fronds is, however, only imperfectly indicated. The plant was growing in the open air in the Oxford Botanic Garden, without protection of any kind beyond the shelter of surrounding walls and hedges. It was planted in a bed of deep vegetable soil, mainly leaf mould, in which both roots and rhizomes could run freely. As usual only a proportion of the fronds displayed the highest character (although all were recognizable), but these, being the largest and most luxuriant, eclipsed and almost hid the inferior ones. Mr. Baker, the courteous and genial curator, is to be congratulated upon a notable success in culture.

I am not sure that there are not two strains of *omnilacerum* (without counting Williams's and Aldren's forms). This Oxford one is evidently the same as the one figured in last "Gazette," whereas Mr. Cranfield's

plant is more like the nature print by Colonel Jones of a plant grown by Mr. Clowes.

The deep leafy frond and fine serrulate margin is characteristic of the one form and a more laxly built frond with very acute lobes, of the other. Of course the differences may not be permanent, but at all events they seem to be distinct "states" of the variety. Both are alike when out of best character—the form is reduced to the mere "serratum," which is most frequently seen.

F. W. STANSFIELD.

THE AUGUST MEETING.

It will be remembered that at the Annual meeting of the members of our Society at Moffat, on August Bank holiday of last year, it was resolved that this year's meeting should be held at Barnstaple, as a favourable centre for Fern hunting in Devonshire and a change from the meetings held hitherto in the Lake District, or, as on the last occasion, in the South of Scotland. By all those who are intimately acquainted with Devon and its adjacent counties, Dorset and Somerset, it is recognized that not only are more species to be found there than in the northern districts, but that they are far more abundant, a fact which is proved by the discovery of far more fine varieties by such hunters as Moly, Wells, Wollaston and others, including Benbow, to whom we refer elsewhere, than can be recorded from other parts.

As a preliminary to the contemplated meeting, Mr. W. B. Cranfield and the Editor devoted the Easter holidays to a visit to Barnstaple, with the double view of making arrangements for the members' accommodation and of determining as far as possible the best hunting localities within easy reach of Barnstaple. With regard to the first item, they put up at the "Golden Lion" Hotel, where the main meeting place will be located,

while there are numerous Temperance and other Hotels, on more economical lines, for the selection of members who may prefer them or who cannot be provided for at the "Golden Lion," where sleeping accommodation is restricted to some eight or ten.

One advantage presented by this town is the existence of a narrow gauge railway crossing the country to Linton, and thus tapping at intervals some of the ferniest districts which it is possible to find in Great Britain, innumerable typical Devonian lanes deeply sunk in high banks, teeming with Ferns, permeating the country in all directions; while in such places as Woody Bay and Hedensmouth, on the coast, the wealth of Ferns in the sloping woods must be seen to be believed. At this early period of the season Fern hunting naturally was severely handicapped, the deciduous species being only represented by dead and shrivelled fronds, while even the evergreens were more or less weather-beaten, browned and damaged. From previous experience, however, we know that the following species abound, viz. *Lastrea filix mas.*, *pseudo mas.*, *dilatata*, *æmula*, *montana*, *Polystichum angulare* and *aculeatum*, *Athyrium filix fœmina*, *Asplenium trichomanes*, *Adiantum nigrum*, *ceterach*, and near, and on the coast, *marinum*, *lanceolatum*, *P. vulgare*, *Scolopendrium vulgare* (everywhere), *Blechnum spicant*, and of course *P. aquilina*. *P. angulare*, and *Scolopendrium* prevail in the hedgebanks, and the latter in some parts fills the interstices of the stone dykes by the hundred. In the course of our rambles we took careful account of the richest areas, and thus shall be able to afford reliable guidance to the hunting parties, which we anticipate will be organized as usual before and after the meeting, of which a due reminder will be given in July.

Meanwhile we would ask our members to take special note of this preliminary advice as we are naturally extremely anxious that with our largely increased membership a goodly number should seize the occasion not

merely of a pleasant outing, with possible prizes, but also of meeting a congenial coterie of fellow Fern lovers to mutual advantage. In conclusion we may mention that the members should, if possible, assemble on the Friday evening prior to the meeting, thus affording opportunities for excursions, which can be arranged for the following days.

FERN POCKETS AND OTHER CONTRIVANCES.

For those who possess a knack of making things for themselves, a word or two on home-made contrivances in the Fern line may be apposite. Rough pockets and troughs made of cork are common enough, and in the early days of our fern fever we constructed a number of such from the masses of rough cork supplied by nurserymen and fitted together by means of strong copper wire, a bradawl, a pair of cutting pliers, and a rough saw. For this purpose the tubular pieces are very adaptable, especially as after a good soak in water they become pliable and can be opened out, and of course when secured by wire to each other or their supports retain their shape. We figure one of these so treated and attached to an ordinary roofing slate (Fig. 1), this particular one being of peculiar interest to us, as it still retains a crested Lady Fern in full vigour, which was planted in it when made at least twenty-five years ago, all that has been done since being to fill up occasionally on the top with a few handfuls of compost when shrinkage has afforded room. A number of seedlings have spontaneously appeared in the various holes indicated, and the Lady Fern has developed several crowns, and throws up every season a full number of healthy fronds, two feet or more long, though we confess that it is a puzzle to us what the roots can find to feed on after so many years of growth within so confined an area of the same soil. The use of roofing slates is, however, less common and yet they



FIG. 6.

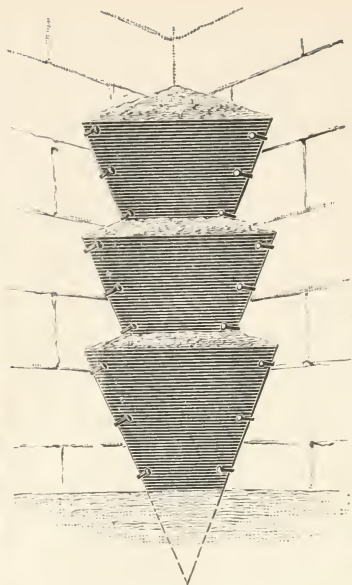


FIG. 2.

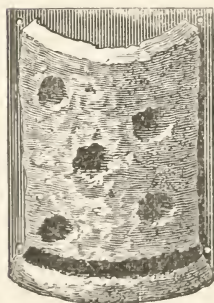
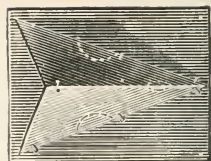


FIG. 1.



C



B



A



FIG. 3.



FIG. 4.

form admirable material, quite imperishable and not unsightly. The ordinary roof slates, obtainable from any builder, are of two kinds, oblong, about two feet long and over one broad, and longer, narrower and thicker ones which are used at the ridges, about four feet long by six inches. These can be sawn into required dimensions with a rough ordinary saw, or broken after deeply scoring the surface with a bradawl and pierced where required by the same instrument. We give a few illustrations of what can be done with these, which practically explain themselves.

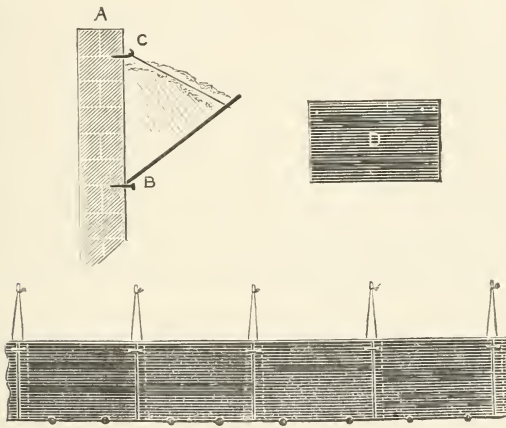


FIG. 5.

Fig. 2 shews how a corner can be filled up with a series of pockets, each of which can accommodate one or more ferns without interference with the others, nails driven into the wall securing them in position; and Fig. 3 shews how the material for such pockets can be shaped, and also how one can be attached to a slate and be capable of removal, the necessary holes for the wiring and holes for small lateral plants being indicated. In wiring the wire should be bent and passed through from the outside, the twisting by pliers being effected behind or inside for neatness sake.

These are really very easily made and are practically everlasting.

Figs. 4 and 5 shews a capital window box made with the narrow ridge slates, and also the mode of constructing troughs on walls or in frames with the same material, though here, of course, the larger ordinary slates can also be used in like manner, A shews the wall, B a row of strong nails driven in at every slate length, C a row of strong galvanized hooks at the same distance, and D shews the position of the holes for the overlapped slates, where connection is made with copper wire by passing it through and over the hooks as shewn. Overlapping is not essential with the narrow ridge slates, nor absolutely so with the larger ones if care be taken to suspend them evenly so that the edges fairly meet. Such troughs are extremely handy, and can be made to occupy wall room with fine effect. Needless to say the ridge slates are also well fitted for flat shelves, laid on galvanized angle iron brackets.

With the ridge slates, removable suspended troughs can be constructed on the principle of the window boxes, triangular ends and central stiffeners being inserted and wired as already described. Suspension is effected by means of nails in the wall, passing through the holes which are already provided in the slates. In all these contrivances good drainage should be supplied by pieces of broken bricks or pots, as in the troughs the shape tends to tight packing of the soil, which of course should be a light and open compost.

C. T. D.

OUR WONDERFUL NATIVE FERNS (*continued*).

In any case, to whatever cause the great pre-eminence of Great Britain in beautiful fern sports may be due, its existence cannot be challenged, as is evidenced by the latest issued general descriptive list of Mr. E. J. Lowe, F.R.S., "British Ferns" (1891), in which nearly 2,000 varieties are classified and described, of which over 1,100 were found

wild, *i.e.* under absolutely natural conditions among the common specific types. Nearly all the forty odd species have contributed, but three species stand out markedly from the rest in the marvellous versatility with which Dame Nature has endowed them. These are the Hartstongue (*Scolopendrium vulgare*), 450 varieties; the Lady Fern (*Athyrium filix fœmina*), 313 varieties; and the Shield Fern (*Polystichum angulare*), 384 varieties; the six species of Buckler Ferns (*Lastreas*) following at a respectful distance with a total of 259, and the common Polypody of our hedgerows and old walls (*Polypodium vulgare*), imitating them with the respectable quota of 75. The Hartstongue, it will be noted, stands out as the most varied of all, a fact which must strike anyone very forcibly who is familiar with that simple strap-fronded fern, as we may see it starring old walls with dwarfed specimens, or pushing out lush-growing bright green tongues from the hedge bottoms of Devon, etc., where it revels most. This fern is, in point of fact, the most remarkable fern in all the world as regards its protean character. It is worth while to study it a bit to see how it has managed to assume 450 distinct forms. The plant normally consists of a radiating bunch of fronds, consisting of a bare stalk some inches long, surmounted by a strap-shaped, smooth, plain-edged leaf with two semi-circular lobes at the point where the stalk enters the frond and forms its midrib. The plain strap form continues for some distance, and then tapers a little abruptly to a blunt point. Now a very short search where plants are plentiful will yield specimens with divided tips to the fronds, an indication of that peculiarly faculty of forming tassels which seems to pervade the fern family generally. In the Hartstongue this capacity is evidenced in all grades, from a mere forking to a many-branched ramification on bunched or fanned lines finely cut, or coarsely cut, and in fact varied in scores of ways on this particular line, culminating in one instance (*S. V. densum Kelway*), in a dense moss-like ball of vegetation, in which all semblance of the frond

proper is lost. The flat strap may be transformed into two parallel deep frills, and these frills may bear beautiful fringes, the plants so characterized, *i.e.* the *crispum* section, being certainly the most beautiful of all. Then the plain edge may be saw-toothed or even deeply cut in quite obvious attempts to assume the divided frond form of other species. This has many grades. The smooth surface may be ridged, roughened, and otherwise varied both above and below, the two round lobes next the stalk may be extended into pointed ones, and then into long tasselled ones, or even into secondary fronds to form a trident one way or a barbed arrow in another, and finally, two or three of these peculiarities may be combined, so that a little consideration will show that even the 450 does not exhaust the possible combinations, and in point of fact only represents such proportion of existing varieties as could be definitely christened. It is, however, to the Lady Fern and Shield Fern that we must look for the most beautiful forms, and here it is the Lady Fern which, true to its name, has been most inventive in new and charming fashions. The plumose or extra feathery forms of both these species constitute the *élite* of British Fern forms, the density and lace-like delicacy of the finely cut frondage, and the grace of the many stranded tassels which hang pendulously from the tips of the divisions cannot possibly be conveyed except by illustrations, and even then but faintly. In point of fact we feel so strongly the impossibility of conveying any adequate idea of what the finest forms of British Ferns are like by mere words, that we will not attempt to do so, but will merely invite special attention to their study when private collections are available for a visit or public exhibitions, such as are now being prepared, present the desired opportunity.

It is worthy of remark that with very rare exceptions all these beautiful forms are perfectly hardy, of very easy culture, and only require glass protection in such cases where their delicacy of cutting or make demands protection

from winds or heavy rains. Every conservatory facing North and in the shadow of the house, is far better adapted for a collection of British Fern gems, than for flowers. In the garden, they are admirably fitted for rockery culture where a little shade and shelter can be given them. In this connection we can only express our regret that the common weed forms of two or three species, Male Fern, Lady Fern and Shield Fern as hawked about by vandalistic costermongers in the Spring, or displayed ignominiously in boxes outside nurserymen's shops, should constitute the popular ideal of our British Ferns, and figure monotonously in thousands of gardens by the dozen and by the score, while the great store of far more beautiful and varied material such as we have described, is all but utterly ignored.

Finally, in scientific hands it has been found that our native Ferns, in addition to their external "sportive" character, afford many equally remarkable and instructive variants in their reproductive phenomena and cell formation generally. This branch, however, is of too technical a nature to admit here of more than an allusion, it constitutes a unique chapter in itself.

CHARLES T. DRUERY.

THE TRANSMUTATION (?) OF *LASTREA* *ÆMULA*.

The late Mr. E. J. Lowe, whose name is so well known to every lover and grower of Ferns, and whose writings have done and still are doing so much for Fern culture, makes in his little popular book "British Ferns," which was published in the Young Collector Series, 1890, by Swan, Sonnenschein & Co., a curious statement about the transmutation of one species into another. This is the passage, which occurs on page 145 :—

"In a wood at Hackness, near Scarborough (I am "speaking of twenty years ago), *N. dilatatum* was near the

“base of the hill five feet high, and was common to half-way up this hill, where *N. Æmulum* mingled with it; higher up *Æmulum* was common, and *dilatatum* absent. My brother and myself being surprised at this change, we determined to test it, and from many thousand plants of *Æmulum* we removed five hundred to Highfield House. In a couple of years several changed to *dilatatum*; the next year an increased number, until at length *Æmulum* was the exception to the rule. At the same time we had a score in pots, but none of these changed.”

Having come from such a source as it does, and being so very particular and circumstantial, it is worth consideration. Bacon writes in his *Natural History*, § 525: “The transmutation of species is, in the vulgar philosophy, pronounced impossible; and certainly it is a thing of difficulty, and requireth deep search into nature.” But Mr. Lowe’s experiment fails to prove what he believed about the transmutation of *Æmula* into *dilatata*.

If the experiment were worth anything, the same conditions should have been observed with both the score and the five hundred, but he grew the latter in the open, and the former under glass. Were Mr. Lowe’s supposed experience of any force we would never find *dilatata* and *Æmula* growing together, as he acknowledges he found them half-way up the hill. My own experience is that they are often found mixed in localities in Kerry and Mayo, from sea level up to five hundred feet. I wonder whether Bacon believed in this transmutation, at any rate he acknowledges the “difficulty” and necessity for “deep search” in arriving at a conclusion as to the transmutation of species.

Evidently Mr. Lowe held that *dilatata* and *Æmula* are two forms of the same species, the former being the lowland and the latter the highland form. If this were so, would it be possible to have *Æmulas* growing in the lowlands? Mr. Lowe’s potted *Æmulas* seemed to have grown all right when brought down from their native habitat, and

none of them showed any disposition of turning into *dilatatas*.

I cannot imagine that two species, which possess a large number of features in respect of which they differ from each other, should be transmuted the one into the other according as they chanced to grow on a high or low land. However, as Mr. Lowe says nothing about *dilatata* turning into *Æmula*, his transmutation difficulty becomes the greater. It is *Æmula* alone that has this property.

My own experience with plants of *Æmulas* removed from their native habitats in Kerry and Mayo to my garden in Down is this: It is often chary of putting up new fronds when replanted, and often dies in the first or second year. This I attribute to the rough usage the plants received when taken out of the ground, and to the great amount of moisture lost by the plant while being carried home, and perhaps not getting any water or being replanted for several days. Such treatment is often unavoidable, but it does not tend to encourage the plant to heal its wounded stolons, roots and fronds; they consequently linger in a delicate condition for a few years and then die. The remains of the dead plant, be it large or small—its crown—is left in the ground, and I have over and over again noticed that such dead stools become a nursery for young ferns of various species.

They are ideal spots for the spores from the neighbouring Ferns to commence life in. And then some day the owner comes round and chances to see a *L. mas.* or *f. fœmina*, or a *dilatata* tiny frondlet growing out of the lifeless crown of what had been an *Æmula*, and hey, presto!—there you are! *Æmula* has transmuted into *dilatata*! !

In Mr. Lowe's experiment the twenty plants grown in pots were, I presume, kept under glass, and therefore were less likely to have spores of *dilatata* settling on them, while the five hundred that were planted in the open in his garden were exposed to having spores of *dilatata* borne to

them by every wind of heaven. This is the solution of this mystery.

At the moment of writing (May, 1911) there are in my Fernery several examples of this; these plants of *Æmula* were brought by me five years ago from near Lough Eagle Mountains, two miles west from Dingle, the most westerly mountain in Europe, and now young *dilatatas* occupy their places.

These squatters in the old dead stools of *Æmula* in a couple of years will be at least as large as each *Æmula* originally was, and if I had not seen the interloping *dilatatas*, when the first frondlets issued from the prothallus I might have been puzzled to account for the presence of *dilatata*; yes, and some *felix. mas.* where I had planted nothing but *Æmula*. There is nothing to establish the transmutation Mr. Lowe thought he had discovered.

The points in which *Æmula* differs from *dilatata* are these:—

ÆMULA.

Scales of stipe fewer, narrower, mostly torn at margin, and concolorous.

Fronds more decidedly evergreen, annual decay begins at apex and proceeds downwards, the stipe continuing firm to the last.

Surface of frond both of pinnæ and pinnules concave, having a crispy appearance.

Indusium bordered with sessile glands.

DILATATA.

Scales of stipe more numerous, wider, entire at margin, strongly two-coloured, the centre dark and margins paler.

Fronds not lasting so long, decaying from the base upwards, the stipe often withering while the frond still retains its greenness.

Surface of frond more or less convex.

Indusium fringed with stalked glands.

ÆMULA.

Frond has a pleasant strong fragrance when bruised, resembling that of new hay, and, as in the case of hay, becoming developed during the desiccation of the plant.

DILATATA.

Frond has no more a peculiar odour than has *L. f. mas.* or *L. f. fœmina.*

All these characters are permanent in the normal forms, and most of them are found in the few varieties of both these species known to cultivators.

H. W. LETT.

The above interesting note from the Rev. Canon undoubtedly entirely disposes of the idea entertained by Mr. Lowe, that *L. æmula* changed, owing to the environment, into *L. dilatata*. *L. æmula* in the open is a far more delicate and less assertive fern than *L. dilatata*, and would be very apt to perish where the latter would thrive. As the Canon points out, there are very distinct specific differences between the two, and the simple fact that the potted plants grown under glass retained these characters, while with those in the open they disappeared and were replaced by *L. dilatata* ones, simply means that high or low evolution had nothing to do with the change, but simply that *L. dilatata* throve and multiplied itself by spores and otherwise, while *L. æmula* died out.

EDITOR.

FERN "SEEDS."

As in some of the reviews of my book, "British Ferns and their Varieties" (Routledge), my use of the word "seedlings" as representing Ferns raised from spores has been contested, as also my consideration of the incipient growth in the Fern *prothallus* at the base of the *archegonium* as the equivalent of a seed proper, I should like to explain the matter. In the first place I write for the layman and

not the scientific botanist, and therefore use as simple terms as possible; and in the second place I am quite incapable, in view of the facts, of comprehending the objections. In both the flowering plant and the Fern *prothallus* we find a similar chain of cause and effect. In the flowering plant the future seed vessel contains at first unfertilized cells, from which part of the vital nucleus has been removed to make way for an independent part, subsequently provided from the equally diminished pollen or male cell. In the process of fertilization these two half nuclei are brought into conjunction and so form a perfect cell, which is then enabled to divide and multiply, forming in the process a perfect seed, which eventually reproduces the plant. The seed here is capable of detachment, and of being scattered abroad to propagate its kind. In the Fern the detachable propagating body, the spore, is an unfertilized cell protected by a coat or husk. By virtue of this unfertilized condition it is incapable (except under abnormal circumstances to which I will refer later) of direct reproduction, but when it finds suitable conditions where it becomes deposited, it produces a small flat green scale attached to the soil by root hairs, and on the underside of this there are generated two sets of organs, male and female (*antheridia* and *archegonia*). The male ones are tiny pimple-like bodies, and the female ones small elevated hollow teat-like bodies, at the base of each of which, embedded there in the thickened body of the scale, is a cell. This cell, like that of the embryo seed, has only half a nucleus. When ripe the male bodies burst and emit a swarm of small swimming tadpole-like organisms, in the head of each of which is a similar cell also deprived of half its nucleus. We have here, to my mind, an exactly paralled case to that of the flower, since eventually the two half nuclei come together, the male germ travelling to and thus reaching the female one. This junction being effected the reproductive female cell is completed, divides and redivides, produces a root and a frond with a basal bud, and thus reproduces the Fern precisely

as does a seed proper. The main difference then is, that whereas a seed proper is provided with a store of nourishment to give the young plant a start in life, the fern equivalent of a seed derives its primary nourishment from the scale or *prothallus*, and hence does not become detached, the prothallus acting as fostering nurse until the young fern by means of its root system is fairly established, when the scale decays and dies.

It is for these reasons that in my several works on British Ferns, and in many descriptive articles, I have always regarded the two kinds of organs under the Fern prothallus as the "homologues" or counterparts of pollen grains and ovaries in the flowering plants. They perform the same functions entirely, though in somewhat different fashions, and I cannot but regard it as "hair-splitting" to raise objections to the parallel, or, under such circumstances, to find fault with the use of the word "seedlings," instead of "sporelings," in connection with young Ferns so raised. The abnormally produced Ferns mentioned above, and which may be regarded as true "sporelings" and not "seedlings," are those in which "apogamy" occurs. In these the prothallus is produced in the usual way, but instead of the young Fern being sexually produced, as above described, a bud appears, usually on the site of the suppressed "archegonium," and thus develops directly into a Fern. Here of course there is no "seed" or its equivalent, and hence to such plants as are thus produced the term "seedling" is inapplicable, as is also that of "sporeling" in all cases of proliferous Ferns, which are propagated by buds formed on the fronds or elsewhere.

CHAS. T. DRUERY, V.M.H., F.L.S.

THE LADY FERN.

ATHYRIUM FILIX FÆMINA.

The Lady Fern, like the male fern, was christened without any regard for sex, and simply on account of the relative delicacy or coarseness of make; but though modern

scientific research has shown that in most ferns, as in most flowers, the two sexes exist, to which the so-called Lady Fern is no exception, the equally modern research of the fern hunter has proved that in diversity of costume and delicacy of taste, the lady-like element comes out very strongly indeed. No fern, in fact, in all the world has by virtue of its sportive character adopted so many fashions, beautiful or curious, as has the Lady Fern. Even with the common types, which we find in such profusion in ferny country places, in glens, damp woodlands, ditches, and indeed in most shady places in the vicinity of water, we often find it difficult to match exactly any two plants in detail of cutting, texture and habits. Like ladies of the human persuasion, each seems to have a taste of its own, and Dame Nature, sympathetically, has invested them with the faculty of indulging it in this way, though, as a rule, to a limited extent. Every now and again, however, for some reason best known to herself, she invents a new fashion entirely. How, we know not. All that we know, as fern hunters, is that some fine day, rambling through the Lady Fern's particular domain, we find some regal form enthroned in state amid her court of commoners, or, equally meritorious, but more modest, endeavouring to hide her unique charms behind her neighbour's flounces so to speak. To drop metaphor, it is a simple fact that while the *Athyrium* ranks with the three or four of our native species which have given the bulk of varietal sports, it eclipses them all in examples of quite peculiar formation, to which no other fern has so far afforded parallels.

Normally the Lady Fern, delicate as its make, is a remarkably robust and sturdy fern, and under favourable circumstances, such as we find in a secluded glen or ravine, walled in by shading trees in such a way that the blustering breeze is entirely excluded, and traversed by a wild cascady stream which saturates at once both soil and air with congenial humidity, we may find huge feathery specimens shoulder high and a yard and more through.

The freer the growth, as a rule, the more the fronds are cut into sub-divisions, this extending even to the third degree (tripinnate) under the conditions described. The fern is quite deciduous, the fronds dying to the ground in autumn, a fact which the amateur cultivator must bear in mind, as undoubtedly many deciduous plants perish by being assumed to die in the autumn instead of simply going to sleep, subsequent neglect in watering, confirming the wrong assumption. In cultivation ordinary garden soil does quite well, but a good leafy compost does better; the chief thing is protection from drought.

(To be continued.)

BLECHNUM SPICANT VAR. CONCINNUM.

In 1881 I was fortunate enough to find a very beautiful form of *Blechnum spicant* on Exmoor, which was named by Mr. T. Moore "concinnum," or neat, and pronounced by him to be a new form, which has been confirmed since by every specialist. In this variety the normally long lance-shaped fronds, with smooth edged side divisions, is transformed into a long narrow even one of ribbon-like outline, but with round divisions, evenly serrated and resembling small scallop shells, the fronds being nine inches long by only a quarter an inch wide. Since that time, although a number of "strictum" varieties have been found, in which a similar narrow and serrate character is seen for some distance up from the frond base, it is succeeded by pinnæ of the normal length, while Mr. Barnes' *lineare*, which is similarly narrow throughout, has the round or confluent division quite smooth edged.

As wild finds rarely agree exactly in character, I was greatly interested recently on receiving among a number of other fronds for naming from Mr. W. A. Barker, Vale View, Backbarrow, Ulverstone, a long nine inch frond of *B. s. concinnum*, precisely similar to my own and marked "wild find," and on enquiry I learn that this was found in

July, 1909, by Mr. W. Lancaster, near Backbarrow, by Windermere Lake, in a coppice wood by the roadside, and has therefore no connection at all with the original find.

This discovery is the more interesting to me that *B. s. concinnum* constituted my first find of any value, and from it I caught that severe attack of "fern fever" with which I have been affected ever since and have, I have every reason to believe, conveyed the infection to many others, even by the insidious medium of books and correspondence. The plant was found at the very end of a thitherto fruitless fern hunt on Exmoor, in the little village of Simonsbath, a final and forlorn hope inducing a search in a stone dyke on its outskirts, the result being a glimpse of the extreme tip of a narrow frond peeping through a bunch of normals in a deep chink; following this up, six perfect fronds were discovered all springing from one centre in the heart of the clump. A crow-bar gently lifted the rough stone covering the roots, the whole bunch was extracted intact, and the precious "find" carefully disentangled. It and its roots were then wrapped up in wet moss. The following year it thrived and bore spores, and in another season or two several hundred typical plants found their way to all collections worthy the name. Our illustration represents Mr. Lancaster's find reduced from $9\frac{1}{2}$ inches, as indication of the character of the true *concinnum* (page 174, Fig. 6).

NEW FERNS.

From Mr. Henry Bolton, of Warton, near Carnforth, we have received fronds of a very beautiful form of *Scolopendrium crispum* raised by him, which we have named *S. v. c. fimbriatum* Bolton. It is distinguished from all the other forms which we have seen of this section by having well crisped and fimbriate fronds, branching from the base into usually distinct and separately stalked fronds, each of which bears a well-developed terminal bunch crest. The plant is of fine erect habit and very robust. A decided acquisition.

Mr. J. C. Rugman, Plusterwine, Woolaston, near Lydney, Glos., sends fronds of a very good wild find, about three years ago, of *P. angulare*, which we have named *P. ang. acutilobum Rugmanni*; it belongs to the proliferum section.

THE BENBOW HERBARIUM COLLECTION OF FERNS.

We are indebted to our friend and member, Mr. C. B. Green, now of Linden Villa, Argyle Road, Swanage, whither he has retired to spend, we hope, many pleasant years, and find many good varieties of Ferns, for a very remarkable and unique discovery. Mr. Green has for a long period devoted himself not merely to Fern study and culture, as his recent article on "My Fernery" demonstrates, but also to the study and collection of the Middlesex wild flora; and in this connection some years back he met Mr. Benbow, of Uxbridge, who followed the same line but made no mention of Ferns at all. Mr. Benbow died some few years back, and left his herbarium to the nation, and Mr. Green learning that it was deposited in the Natural History Museum at South Kensington went there to inspect it in connection with the Middlesex flora, and to his extreme surprise discovered that it was accompanied by a collection of *several hundreds* of Fern fronds, representing Mr. Benbow's personal finds in Devon, Dorset and elsewhere, mostly in the 'sixties. A large number of these, particularly of *Polystichums*, rank with the very finest forms yet discovered, and were accompanied by dates and localities and also notes, which, apart from distinctness of type, rank the finder as amongst the most fortunate, even when compared with such men as Wollaston, Moly, Wills and others of the early pioneers. Of this fact Mr. Benbow appears to have been fully cognizant, but he also appears to have been a very reticent and retiring man, which is evidenced by an autographic slip in the collection, that he desired to remain anonymous. To this unfortunate desire

it is due, it would appear, that not only did his name remain absolutely unknown and unmentioned in all published Fern records (Dr. Stansfield even never heard of it), but even Mr. Lowe, with whom he corresponded and to whom he sent some of his finds, did not apparently see his way to include such finds in his Fern list of 1890 even anonymously. Neither did Mr. Barlow, as was the salutary custom of his Fern-loving contemporaries, distribute divisions among them and so secure, or assist in securing, their survival as well as appreciation and propagation, the unhappy result being that in all probability the Herbarium in question is now the sole representative of his labours. Our members, Mr. W. B. Cranfield, Dr. Stansfield, and Mr. T. E. Henwood accompanied the writer and Mr. Green to the Museum, and were equally struck with what they found, while the writer subsequently went there on several occasions and made a descriptive list of the choicest forms and of the attached notes, which appears *in extenso* in the *Gardeners' Chronicle*, and by kind permission is reproduced below.

Enquiries have been made as to the possibility of some of these finds having survived in the late Mr. Benbow's garden or elsewhere at Uxbridge, but these so far have had a negative result, and although trial sowings are in progress of some of the spores, it is a very open question whether half a century is not too long a period for survival of vitality. Mr. Benbow, too, appears to have been extremely unfortunate, having left a number of finds in the train on his way to Mr. Sim's nursery at Foots Cray, while a fire destroyed many on another occasion.

The following represent the best varieties of the several species concerned, in which the *Polystichums* are by far the most striking, and are therefore described more fully.

THE SHIELD FERNS.

POLYSTICHUM ANGULARE (about 150 varieties in all).

Decompositum splendens, all fine decomposite forms,

found at Nether Stowey, October 21st, 1866; Seaton, May 25th, 1865; Babbacombe, October 3rd, 1868; Teignmouth, October 10th, 1868; *Densum*, very close set subimbricate pinnules, very fine, Lyme Regis, October 12th, 1864. *Lineare*, very slender, central divisions thorn-like, several places in South Devon. *Pterophorum*, subimbricate pinnules, sessile. *Foliosum*, handsome broad form, South Devon, October 3rd, 1868; Uplyme, October 11th, 1864; Hayes, Middlesex, July 6th, 1866. *Concinnum*, very small pinnules, Ottery St. Mary, July 14th, 1864. *Hirondelle Barlow* (D.), pinnule pairs, like swallow's wings, Teignmouth, October 10th, 1868. *Decurrens flexuosum*, flexuose, with falcate, aculeatum-like pinnules, Honiton, July 19th, 1864. *Distans*, divisions widely separated, Uplyme, October 11th, 1864. *Flexuosum*, very sinuous fronds and pinnæ, Honiton, July 19th, 1864. *Revolvens* (D.), several finds of this type described as recurved, Sidmouth and elsewhere. *Oxyphyllum*, a good acutilobe, Colyton, May 25th, 1865. *Angustatum proliferum* (D.), near Charmouth, October 12th, 1864. *Tripinnatum*, very fine forms found in several places. *Acutilobum*, Kingskerswell, October 3rd, 1868; near Ryde, July 27th, 1863. *Acutilobum proliferum*, bulbils from base to tip, Paignton, October 6th, 1858; also Axminster and elsewhere. *Angustatum*, a remarkably narrow form à la *A. f. f. Frizelliae*, Maidenscombe, October 10th, 1868; Branscombe, May 25th, 1865; and Lyme Regis, October 10th, 1864. *Cristatum*, two forms crested, Langley, September, 1863; Honiton, October 18th, 1864. *Conspicuilobum* (D.), Nether Stowey, October 21st, 1866. *Percristatum*, crested pinnules, counterpart of Gray's, Somerset, June 7th, 1865. *Brachiatum*, broad-based form, Lyme Regis, October 15th, 1864. *Brachiatum*, trifonded, basal pair of pinnæ transformed into fronds, like Keall's form. *Capitatum*, huge spherical comminuted head, pinnæ plain. *Acrocladon*, very ramose and bunch crested, counterpart of Mapplebeck's form. (All three found in

one lane in Teignmouth, October 10th, 1868. They differ much, but Dr. Stansfield thinks they may be seedling variants of the brachiate type, despite diversity.) *Gracile* (D.), very slender, distant pinnules, Stoke-on-Teign, October 10th, 1868. *Stipulatum* (D.), very like Carbonell's form, Babbacombe, October 3rd, 1868. A considerable number of other finds were of the depauperate *grandidens* type, or otherwise defective, and are mostly arranged as a separate set, presumably indicating inferiority.

P. ACULEATUM.

Barlowii, a form very like *P. a pulcherrimum*, but very fertile, and with non-imbricate tips, Dartmouth, October 8th, 1868.

SCOLOPENDRIUM VULGARE.

Of this species over one hundred specimems represent Mr. Benbow's finds; the best are as follows, the names indicating the character, but the large majority are more or less defective forms of "*marginatum*" type, or otherwise of little interest: *S. v. cornutum*, Brixham, 1868, Kingskerswell, 1868; *marginato-cornutum*, Minehead, 1864; *lacerato-cornutum*, Wilmington, 1865; *rotundifolium*, several places; *ramo-cristatum*, several places; *multifidum*, Ilfracombe, 1864; *grandiceps* (D.), two places; *flabellatum* (D.), Nettlecombe, 1864; *corymbiferum*, Kingsbridge, 1865; *laceratum*, Nether Stowey, 1866; *ramosum*, same wall; *cristatum*, two places; *ramo-lobatum* (D.), Littlehampton, 1872; *sagittatum*, Dartmouth, 1868; *crispum*, five types of this rare frilled and barren section were found at Littlehampton, 1872, Gettisham, 1864, Babbacombe, 1868, Charmouth, 1864, and near Ryde, 1863; *digitatum*, Berry Harbour, 1864; *cristato-multifidum*, same place and time.

(To be continued.)

LIST OF NEW MEMBERS.

Mr. A. B. Abbey, 325, Park St. West, Roxbury, Mass., U.S.A.

Mr. R. L. Goulder, Woodcroft, near Chepstow.

Mrs. H. K. Greene, "Grove," Craven Arms, Salop.

Monsieur R. de Litardière, 4, Rue Cloche Perse Poitiers (Vienne), France.

Mr. J. O. McCleery, Ava House, Old Cavehill Road, Belfast.

Mr. John E. Walpole, Highbury, Whitby, near Chester.

"British Ferns and Their Varieties," by Charles T. Druery, V.M.H., F.L.S., with forty magnificent coloured plates, 319 wood cuts and other illustrations, and 96 monochrome reprints of a selection of the choicest varieties, nature printed, by the late Col. A. M. Jones of Clifton, with his original notes *in extenso*. In cloth 7s. 6d. net; in half morocco, gilt, 10s. 6d. net.

It will interest the members to know that by the enterprise of Messrs. George Routledge & Sons, Ltd., the author has been enabled to realize one of the pet ambitions of his life, viz. the production, on practically untrammelled lines, of a thoroughly up-to-date and well illustrated record of our native ferns in their specific and varietal forms, together with such information as to their history, culture and biological peculiarities as will render the work a thorough compendium of knowledge for the amateur's reference plus indications of sources of knowledge valuable to those who take an interest on the scientific side. The addition of an appendix consisting of ninety-six of the choicest of the late Colonel Jones' nature prints, accompanied by his contemporary notes, which the author has been kindly permitted by Miss Jones to use as a supplement, renders this book an absolutely unique one, apart from its comprehensive and practical character in other directions. Certainly no British Fern lover or Botanical Library should be without it as the standard work on the subject, and *it would be an advantage to the author (the Editor of the Gazette and Secretary of the British Pteridological Society) if orders for it were sent to him personally to 11, Shaa Road Acton W.*

== FERNS. ==



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VOL. 1.

No. 9.

... The ...
**British Fern
Gazette.**

PUBLISHED QUARTERLY.

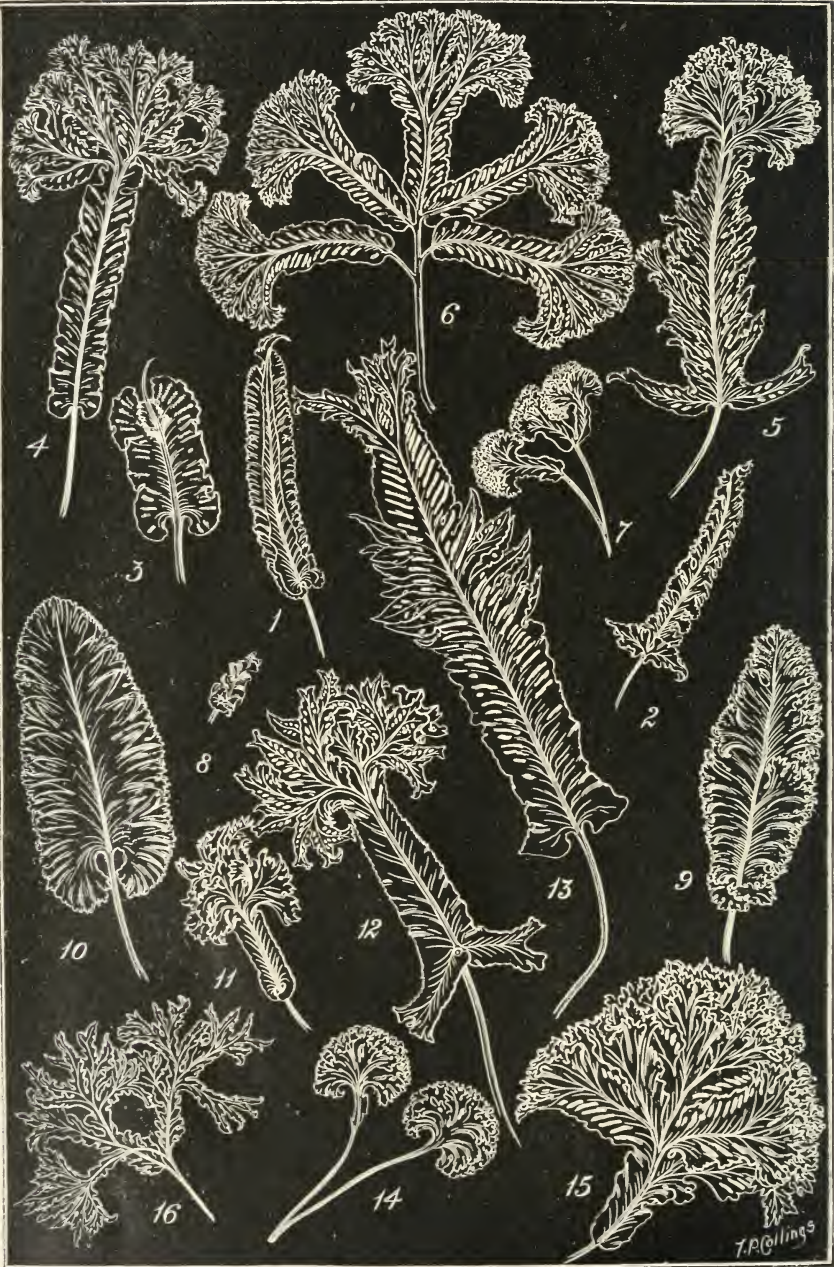
September, 1911.

EDITED BY
CHARLES T. DRUERY, V.M.H., F.L.S.

PUBLISHED BY
THE BRITISH PTERIDOLOGICAL SOCIETY

(Hon. Secretary, C. T. Druery, 11, Shaa Rd., Acton, London, W.),

KENDAL, WESTMORELAND.



THE HARTSTONGUE.

THE BRITISH FERN GAZETTE.

VOL. I.

SEPTEMBER, 1911.

No. 9.

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EDITORIAL NOTES.

This number forms the commencement of the third annual series of the "Gazette," and, as will be seen by the contained Report of the Annual Meeting at Barnstaple, not only has the membership of the Society been largely increased by its issue, but this has been effected with benefit to its funds. We may therefore safely regard it now as an assured success. That no effort on our part will be spared to maintain its interest may be taken for granted, but we would strongly impress upon our fern-loving friends our wish for support in the direction of new members, since we are quite sure that every one of our present ones could at least enlist another, and this alone would put us in a position to enlarge the "Gazette" and increase its attractions, both literary and pictorial, for the benefit of all

concerned. We also sorely lack support of another kind, viz. in the shape of contributions of notes and experiences of our members, so that we may spare our readers a possible overdose of the C.T.D. element, which naturally embraces the experiences of only one individual, while it is abundantly obvious from our face to face conversations with other members at our meetings that their experiences are equally valuable and worthy of record. First, then, please bombard your fern-loving friends and acquaintances, show them the "Gazette," tell them of the society, give us "the tip" if necessary, and in this manner help us in one way, while not omitting to send us a note of anything striking which may turn up within your ken for publication. In this number we give a supplement embracing the names and addresses of the members for reference and some other particulars of interest to new ones to which we draw special attention.

- X Finally, kindly note that subscriptions for 1911-12 are now due and should be remitted to the Editor, 11, Shaa Road, Acton, London, W.

OUR FRONTISPIECE.

THE HARTSTONGUE.

Our frontispiece represents a selection of the most marked varieties of that wonderfully Protean Fern, the Hartstongue *Scolopendrium vulgare*, which gives a good idea of the varied forms into which it has sported, mostly under purely wild conditions. Their names are as follows :—

1. S. V. supralineatum (shewing approximately the normal outline).
2. „ „ crispum sagittatum.
3. „ „ periferens.
4. „ „ cristatum Millett.
5. „ „ laceratum.
6. „ „ ramo-cristatum Moly.
7. „ „ cristulatum (Stansfield).
8. „ „ spirale.

9. S. V. crispum fimbriatum.
10. „ „ crispum grande Wills.
11. „ „ capitatum.
12. „ „ sagittato cristatum Hankey.
13. „ „ „ projectum Sclater.
14. „ „ capitatum Forsterii.
15. „ „ grandiceps John Cousins.
16. „ „ inequale furcans Elworthy.

THE AUGUST MEETING.

The annual meeting of the members was held this year at Barnstaple to enable them to judge of the ferny possibilities of the Southern Counties of England, their visits hitherto having been confined to the Lake District or Scotland. Prior to the actual business meeting at the Golden Lion Hotel, at which Mr. Alex. Cowan as President took the chair, several informal ones were held on the previous days and a very large number of Fern fronds were exhibited by Mr. Cowan on behalf of himself and Mr. Phillips, these embracing a number of remarkably fine varieties, clearly evidencing immense progress in the development of superior forms by selection, and some new "finds" of great merit. The most noteworthy were a splendid form of *Osmunda regalis undulata* found by Mr. Phillips, and far excelling in foliose character an otherwise similar variety of that name found many years ago in the Azores, *Lastrea dilatata crispa ochracea*, shown by Mr. Cowan, had beautifully crispate fronds, liberally and constantly splashed with golden yellow. A cross effected by Mr. Cowan between presumably *Polypodium vulgare* var. *cornubiense* and *P. v. grandiceps* Fox or Foster has yielded a very fine "grandiceps" form of *cornubiense* cutting *P. v. c. grandiceps* Cowan. Another very fine variety was a subplumose form of *Lastrea filix mas* of a very promising type for cultural selection. Various excursions were made to Woody Bay, Hedensmouth, and other ferny districts in the

locality, but owing to the intense and long continued drought, hunting was severely handicapped, the ferns in many places being scorched and flaccid, and their growth so stunted as to mask their varietal character, if any, to an unrecognisable extent. Dr. Stansfield, however, found an *Asp. ad. nigrum* with multifid frond tips throughout and some very foliose forms of *L. montana*; Mr. Druery, among other minor finds, discovered a Hartstongue on lobatum lines but with all frond terminals symmetrically rounded off with sori radiating round the abruptly shortened midrib like the figures on a clock dial, a rare variant which he named *Scol. v. lobatum radiosorum*. Mr. W. B. Cranfield was the most fortunate, alighting upon two remarkably fine varieties, one a wild deltoid foliose form of *Lastrea filix mas* with broad dilatata-like basal pinnæ, and the other, on private ground, a peculiarly fine foliose and imbricate variety of *P. aculeatum* on truly handsome lines which had been found many years ago near Holsworthy. He also found a very marked form of *Scol. v. undulatum*.

The weather throughout was most delightful and the meeting was a pronounced success in every way. Of the business meeting itself the following are the minutes:—

MINUTES OF THE 20TH ANNUAL MEETING of the British Pteridological Society, held at the Golden Lion, Barnstaple, at 9.30 a.m., on August 7th, 1911, with twelve members present as per signatures on opposite page, Mr. Alexander Cowan as President taking the chair.

The Hon. Secretary, Mr. Chas. T. Druery, read the minutes of last meeting of 1910, which were confirmed on the motion of Dr. F. W. Stansfield, seconded by Mr. Eley, and signed by the President.

Mr. W. B. Cranfield as Hon. Treasurer then produced the Balance Sheet as appended to these minutes, shewing an increase of £9 17s. 4d. in the Society's funds and duly audited by Mr. J. J. Smithies, and on the motion of Mr. Cowan, seconded by Mr. Bell, it was approved and accepted.

The election of President and officers for the ensuing year

was then effected, viz. Mr. Alexander Cowan as President being unanimously re-elected, as was Mr. W. B. Cranfield as Treasurer, Mr. Chas. T. Druery as Hon. Secretary, Mr. J. J. Smithies as Auditor, and the following Vice-Presidents, viz. Dr. F. W. Stansfield, C. T. Druery, J. J. Smithies, W. H. Phillips, and W. B. Boyd (Mr. R. W. Praeger was not re-elected he having resigned his membership). On the Committee were re-elected Messrs. T. Bolton, J. J. Smithies, R. Whiteside, W. E. Farrer, G. Whitwell, and W. Wilson. Messrs. T. G. H. Eley and W. Bell were elected to fill vacancies caused by non-election, owing to residence abroad and resignations, of Messrs. Millward, J. M. Barnes and E. Wiper, it being understood that the President, Vice-Presidents, and officers were *ex-officio* members of the Committee.

It was proposed by Dr. Stansfield, seconded by Mr. Cowan and carried unanimously, that the *British Fern Gazette* be continued under the Editorship of Mr. Chas. T. Druery.

It was proposed by Mr. Cowan, and seconded by Mr. W. Gordon and unanimously agreed to that the Committee be asked to consider the advisability of allocating a sum not exceeding £4 for expenses of vehicles in connection with the Fern hunting excursions at the Annual Meetings and the provision of a room for such meetings.

It was proposed by Mr. Cowan, seconded by Mr. Eley and carried unanimously that the Meeting in August, 1912, be held at Arnside, Mr. Eley kindly undertaking to assist in making the necessary arrangements.

It was proposed by Dr. Stansfield, and seconded by Mr. Henwood, that the thirty-one new members who have joined since the last meeting and whose names and addresses appear on the page preceding the signatures of those present, be elected, which was carried unanimously.

It was proposed by Dr. Stansfield and carried unanimously that a very hearty vote of thanks be given to the President, Committee, Treasurer, Hon. Secretary and Auditor for their services to the Society, and to Mr. Chas. T. Druery for his editorship of the *British Fern Gazette*.

BALANCE SHEET, BRITISH PTERIDOLOGICAL SOCIETY, CLOSED JULY 15TH, 1911.

INCOME.

	£	s.	d.
July 28, 1910.			
To Bank Balance ..	64	1	5
" Balance in hand, C. T. D., 2 Subscriptions 10s. included below ..			
" Balance in hand, Mr. Wilson ..	0	8	0
" 122 Subscriptions at 5s., 1910-1911 ..	30	10	0
" 7 Subscriptions at 5s., 1911-1912 ..	1	15	0
" Fern Books, Reports, and Back Nos. of Gazette sold ..			
" Donation, W. D. Scott ..	7	3	3
" Advt. in Gazette, H. B. May £1 1s. see per contra ..	1	0	0
" Interest at Bank.. ..	1	4	9

July 16, 1911.			
Bank Balance brought forward ..	£106	2	5
	£74	6	9

EXPENDITURE.

	£	s.	d.
August 18, 1910.			
By Carriage on Books, etc., from Mr. Whitwell ..			
September 9, 1911.			
" 150 Reminder Circulars, 4s., Rubber Stamp, 3s. ..			
" Cost of British Fern Gazette, Nos. 5 to 8 at £4 4s., and Reprint of No. 1, £3 15s.			
" Miller, Son & Co. ..	20	11	0
" T. P. Collings, Blocks..	2	10	0
" Upcott Gill ..	1	3	8
" Postages and Envelopes 2 13 11			

	£26	18	7
" Less Advt.—H. B. May 1 1 0			
" Postages on General Correspondence, C.T.D.	25	17	7
" Clerical Help, C.T.D.	2	10	2
" Postages, &c., Mr. W. B. Cranfield	0	3	6
" Stationery ..	0	5	0
" Book presented W. D. Scott, 2s. 6d., Sub. to American Fern Gazette ..	0	5	6
April, 13/17.			
" 3rd expenses, Barnstaple, arranging for Meeting, August.. ..	0	6	8
July, 13.			
" Miller, Son & Co., P. Cards <i>re</i> meeting July, 15.	1	10	0
" Balance at Bank ..	0	3	6
	74	6	9
	£106	2	5

CHAS. T. DRUERY,
THE BRITISH PTERIDOLOGICAL SOCIETY,
Hon. Secretary.

LIST OF OFFICERS.

President : Mr. A. Cowan, Penicuik.*Vice-Presidents.*

Dr. F. W. Stansfield, Reading.

Mr. J. J. Smithies, Kendal.

Mr. C. T. Drury, Acton, London.

Mr. W. H. Phillips, Belfast.

Mr. W. B. Boyd, Melrose.

Hon. Secretary : Mr. Chas. T. Drury, V.M.H., F.L.S.*Treasurer* : Mr. W. B. Cranfield, Enfield Chase.*Auditor* : Mr. J. J. Smithies.*Committee :*

Mr. T. Bolton, Warton.

Mr. T. G. H. Eley, Furness Abbey.

,, J. J. Smithies, Kendal.

,, W. Bell, Furness Abbey.

,, R. Whiteside, Lancaster.

,, G. Whitwell, Kendal.

,, W. E. Farrer, Lancaster.

,, W. Wilson, Kendal.

Together with the President and Vice-Presidents as members *ex officio*.

THE LADY FERN (*continued*).

The varieties of the Lady Fern, in the main, divide themselves into two classes, as in other ferns, viz. the tasselled and the extra feathery ones, but added to these characters we have others forming the unique combinations we have referred to. The Victoria Lady Fern (*A. ff. Victoriae*) stands at the head of this section, and yet was found by the side of a country lane in Scotland in all its curious development. Incidentally we may mention here that fern varieties can be crossed together through their spores, in which way some curious combinations have, so to speak, been made by man, but this Victoria Lady Fern is no such product. Nature alone had a hand in it, and man moreover so far has failed to better it by selection. In this fern the fronds are very long and narrow, the pinnæ or side divisions are also long and slender, and, like the frond tip, are divided at the end into slender many-stranded pendulous tassels. The marvel, however, comes in the fact that these side divisions are not set on singly at nearly right angles to the stalk, as in most ferns, but are set on in pairs at right angles to each other, and as each pair has its fellow pair on the opposite side of the midrib, the two form a cross, and of course the two

rows from end to end of the frond form a delicate lattice work bearing two rows of charming tassels. Where, we ask, in all vegetative nature can be found a parallel to such a "sport"? Finally, on close examination, it is seen that even the smaller sub-divisions are set on in pairs in like fashion, so that the pinnæ are formed of tiny crosses too. The spores of this variety always yield typical plants, but we have never yet seen a seedling attain the full size of the parent, nearly four feet.

Other peculiar types are the *Frizelliæ* section, crested and uncrested, in which the side divisions are bunched up into round knobs, giving the fronds a resemblance to a string of beads. *Vernoniæ* and *conioides* are examples of curious makes of the pinnæ, which cannot be described but have no parallels. The crested or tasselled forms are many, varying considerably in make and habit and ranging from pretty little flat tassels up to ball-like dense ones, where the flat frond is maintained, or running into single balls of fine mossy looking growth, where the fronds branch over and over again to form that effect (*A. ff. acrocladon* and *uncoglomeratum*). The varieties, indeed, which are good are so numerous, that space precludes description, and we must refer to published catalogues.

The plumose varieties are by many considered the finest, and in these the cutting is carried even to the fifth degree (quinquepinnate), imparting an extremely feathery appearance. The wild finds are *Axminsterense*, *Horsfall*, *Wills*, *Hodgsonæ*, *Pounden* and others, all quite distinct from each other. The *Axminster*, however, has proved the greatest prize, as a wild find, by yielding first *plumosum elegans*, a still finer cut form, and through this the really marvellous section of superbums, crested and uncrested, among which are the two absolutely finest Lady Ferns extant. *A. ff. plumosum Druery* (uncrested) and *A. ff. sup. percristatum* (crested to the fourth degree), while at least a dozen other distinct crested and uncrested plumose forms are in the same section. These varieties by themselves would suffice

to stamp the Lady Fern as standing alone among the varied ferns for versatility of taste and exquisite delicacy in expressing it.

CHAS. T. DRUERY, V.M.H., F.L.S.

THE BENBOW HERBARIUM COLLECTION OF FERNS (*continued*).

POLYPODIUM VULGARE.

Three very good forms were found, viz., *omnilacerum cristatum*, a very promising deeply serrate form with furcate pinnæ, Holford, 1866; *omnilacerum*, a thoroughbred deeper cut form, Cleve Abbey, on wall, 1864; and *crenatum*, a deltoid form, near Fulmer, Bucks., 1892.

CYSTOPTERIS FRAGILIS.

A good crested form was found on a wall near Totnes, which yielded fairly true progeny from its spores.

LASTREA FILEX-MAS.

Three forms only worthy of note of this species were found. *L. f.-m. brachiatum*, a very marked variety, foliose and ramose, but not tasselled, Fulmer, 1866; "*serrata*" (*D.*), a beautiful deeply serrate form with fringed pinnæ, Axmouth, 1864; and *polydactyla*, strongly resembling Dadd's Ilfracombe form, Kingsbridge, 1865.

It will be noted that no varieties of *Athyrium filix fœmina* or *Blechnum spicant* appear in this list, since though a considerable number of both figure in the Herbarium, the curious fact transpires on inspection that all of them were found either in Black Park, Bucks., or its vicinity, and in the case of the Lady Ferns, appear to be variable seedlings of the *Craigii* type, while the *Blechnum* are variants, sometimes very singular ones, of the "*strictum*" type. The inevitable inference, therefore, is that Mr. Benbow here struck either upon a favourable locality in which spores of these forms had been previously scattered or had unwittingly raided a collection of planted out seedlings, no

less than sixty-eight crested Lady Ferns being gathered in a comparatively short time, plus the Blechnums. This being the case, we naturally refrain from ranking these as wild finds proper, but with regard to the others, the attached notes and particulars and general character of the fronds, put their value as such beyond all doubt.

CHAS. T. DRUERY, V.M.H., F.L.S.

FERN SPORE SOWING.

As I have been asked to write with regard to the relative length of time required for the germination of fern spores, and the subsequent development of the fern from the *prothallus*, I may say that so much depends upon season, temperature, and treatment, that it is not easy to give definite data. One fact is certain, and that is that different species vary greatly in the relative rapidity or slowness of the process, as they do in the subsequent development into established specimen plants. Undoubtedly the best results are obtained when the spores are sown so soon as they are ripe, that is, about July with most of the species. By sowing freshly gathered spores of Hartstongues, Lady Ferns and Lastreas at that season, *prothalli* are usually visible in two or three weeks, and the young plants may be visible in five or six weeks later, always provided that the culture be kept thoroughly moist, free from sunshine, but otherwise well exposed to light. *Polystichums*, however, are much slower in development, and spores sown in July, though they produce *prothalli* in the early autumn, may quite possibly refuse to produce plants until the next growing season. *Osmunda regalis* spores must be gathered as soon as the fertile spores complete their growth, they are then quite green in colour, and if the brown stage, usually indicating ripeness, be waited for, all the capsules will be withered and the spores shed. Germination in this species is rapid, a week or ten days sufficing to show green *prothalli*, though of course it is some weeks later before these grow to full size, and effect their reproductive functions.

For the beginner, Lady Ferns, Hartstongues and Lastreas are the easiest to deal with, as is proved by the fact that under glass they appear in abundance as strays, *i.e.* self-sown plants, which is rarely the case with Shield Ferns. *Polypodium vulgare* varieties are very slow, and it requires several years to bring the young plants up to specimen size. Next to sowing immediately when ripe, that is in the middle of the growing season, collecting spores then and sowing them early the following Spring, say in March, has the advantage that if the summer-sown *prothalli* do not make plants before the winter, there is a danger of confervoid growth invading them or sourness setting in during the resting season, from which Spring sown spores of course are exempt. If, however, a moderately warm house be available for winter accommodation, all the stages of growth are greatly accelerated and much time saved.

The first essential in all cases is persistent moisture. The pots or pans containing the spores should be well drained and kept standing in saucers of water, and be covered with glass slips. As already stated in former articles, the soil should be of a leafy open character surfaced with a little loam in small lumps and pressed flat. Prior to sowing a piece of paper should be laid on this, and boiling water poured thereon until it runs out at the bottom scalding hot. This kills all worms, germs, and alien spores, and gives a fair field for the fern spores, which should be scattered very thinly and evenly over the soil when it has cooled. Cover with glass, make a registry of the sowing by means of a number, marked clearly on the pot or pan, or preferably on a small label, and put in a well-lighted position out of sunshine, standing them, as we have said, in saucers or bedding them in cocoa-nut fibre. As any small pot will accommodate quite a sufficient crop for any amateur, it is well to sow in thimble pots, a number of which can be compactly bedded in a nine-inch pan, and covered with one pane of glass. All that is then necessary is to see that the fibre is kept quite moist. Watering must be done from

below when necessary by plunging the pan up to its edge in water, until it appears glistening on the surface. Flooding the soil surface itself is detrimental, until it is covered with mature *prothalli* when, if done with clean water, it may facilitate the fertilizing process.

To return to our original point, viz. the time required for germination, it may perhaps be roughly put down at three weeks in the growing season, but the subsequent development depends largely upon the nature of the caudex which the Fern forms, and if this be large and fleshy in the full sized plant, it is probably a question of four or five years before the full character is brought out. When once, however, a course of sowing has been begun, each season brings its own reward in turn, and many ferns when only a year old or even less are very beautiful, even though not of full size. Owing to the difference in the period of spore development, it is always advisable to sow each species and variety separately, unless crossing or hybridizing is intended, since otherwise the more rapid growers are bound to develop at the expense of the others. So soon as the young plants show, or sooner if the *prothalli* are crowded owing to too liberal sowing, it is well to prepare pans, scalding them as indicated, and prick out little patches of *prothalli* an inch apart, pressing them gently into the soil after inserting them into little depressions made to fit them. Each will then produce a little clump of plants which, when again crowded, can be lifted and dropped into a saucer of water. This will facilitate the separation of the plants, and particularly the roots, and enable them to be pricked out separately again an inch apart, when they will develop into a size for potting on. By this time their character will be evident, and any rogues or inferior forms should be thrown away or improvements marked for special care.

C. T. D.

A FERN PARADISE.*

While in Ireland during the end of June it was a real pleasure to re-visit Lemonfield, Holywood, on Belfast Lough, and shake hands with our octogenarian friend, Mr. W. H. Phillips, and see his unrivalled collection of hardy ferns, all British, with their many and variously tasseled sports, the more especially as the friend travelling with us was an expert, and knew the fern world from "A to Z." To go over a thousand or two in such congenial company was an educational treat, as well as a social delight, as Mr. Phillips describes each variety with first-hand knowledge, having found many of the rare sorts in his fern-hunting rambles; and the fine personality of his accounts where this was got, or the happy accident that displayed another gem to his "eagle eye," gave point and interest of a most characteristic nature. Readers of our paper have lately had the pleasure (which all fern lovers duly enjoyed) of his racy description of how he became a Fern hunter; therefore they will understand how the more telling voice, with the very specimens before him, were striking texts from which to expatiate on their qualities, differences, developments, from common-looking forms to the crested, feathery beauty they now displayed. As it takes a real judge to select from a batch of foals one that has the making of a Cawdor Cup winner, so only a born fernist can see in the rather raw, half-developed seedling the future novelty, which all growers will desire. It is impossible to detail, even by name, a more than representative few of the innumerable Ferns at Lemonfield. Non-experts have no idea of the "sports," the "finds," of the last twenty years in British Ferns! Even in one or two classes, as Hartstongues, Athyriums, and Polystichums, the varieties are legion. The cult is very modern, but the enthusiasm of Fern lovers has been great, so that in fifty or sixty years the results are amazing. Mr. Phillips grows them in flat, sunshiny borders in ordinary garden soil, fortified with leaf mould, etc., as the

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subjects require. Think, for instance, of the drought of June, and yet that day of our visit he had transplanted a big bed of Ferns in full feather, and not one frond was harmed. Novices must observe times and seasons; experts can do these things at all seasons. To give readers an idea of the riches in Ferns in one collection, we will name a few of each class, from which those seeking to add to their stocks may rely on them as good. The *Polystichums* are strongly represented, while *P. angulare rotundatum* and *P. plumosum cristatum*, ditto *setosum*, and a fine *cuneatum* found by Mr. Phillips on Cavehill, across the Belfast Lough, give a personal touch to these beauties. We must not omit *P. a. divisilobum densum*, which was variegated, but that is gone. However, *P. a. p. robustum* has retained the golden colour. *Lastrea dilatata*, with a golden variegation, without doubt marks a new feature in Ferns. *Polystichum a. retroflexum* is a curiosity, as it looks as if all twisted up. Then *P. a. divisilobum stipulatum* is a queer thing, as the fronds look as if thatched with a secondary growth. We admire *P. a. divisilobum perserratum longipinnatum*. Phillip's *Polystichum plumosissimum Stansfieldii* is another gem. The *Athyriums* are a great family, and we have worthy specimens, as *A. filix femina acrocladon* looks like a moss, while another, *A. f.f. pagoda*, is called so, as the fronds curve up with fringes below, quite a remarkable specimen among even many very much so. The *Poly-podies*, as *cambricum*, *cornubiense*, are most excellent Ferns, growing vigorously, too, in the open garden, with very little cover from overhanging trees. Coming upon the *Scolopendriums* (Hartstongues), we are struck with a big bed of wondrous crested forms, some just like mosses, but the marvel is that the major portion of them are variegated. Even *crispum* is so, but *capitatum* is green. Now, some authorities will not admit that this variegation is fixed, but here we are assured of it, having ocular proof before us, while certain that the colouring has stood so for ten to twenty years. Truly the possibilities of new and beautiful

developments in Ferns are to be expected by and by, seeing that hitherto hunters have gathered in their natural habitats so many of the loveliest varieties we have, and these have given seedlings of astonishing forms. Therefore, when hybrids are raised from these variegated sorts, it is quite evident that the colouring will repeat in the youngsters, with even other characteristics we as yet wot not of. Ere we conclude our notes we have a look at the *Osmunda regalis undulata*, from the Azores, and *O. r. interrupta* (Phillips), a pair of fine varieties, also a form of *Osmunda undulata* found by Mr. Phillips near Recess, in Galway, similar to the Azores form, with *revolvens*, and others equally curious. Near by we find *Lastrea Padley's depauperatum*, as also *Lastrea filix mas Barnesii*, a fine memento of a great Fern friend it is. Altogether we have but skimmed over the "ken-speckle" varieties, leaving unrecorded the countless regular forms and less notable ones, but time and tide, not to speak of dinner, wait not, so we bid Mr. Phillips adieu, having seen and enjoyed a Fern paradise such as we have not experienced before, and with a guide who combines the knowledge and the gift of imparting it in a high degree, not to speak of the geniality and enthusiasm he displays and provokes in others.

ERRATIC FERN SPORES.*

By the term "erratic" we mean in this case such spores from a constant parental form as will yield very diverse progeny, not merely on one occasion, but, as a rule, successive sowings from different annual crops yielding similar results. As is well known, when once the normal type of a plant has broken into an abnormal one, yielding a "sport," the seed or spore, as a rule, inherits the peculiarity; but it is also a well-recognised fact by all selective cultivators that the peculiarity may appear in different grades in the progeny, being more emphasised in some and less in others, the more emphasised cases

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constituting the selector's opportunities for improvement of type. In this way, sometimes by gradual steps and in others by more advanced ones, the greater part of our horticultural wealth of flower and foliage has been acquired.

In the cases, however, which we have in mind, the spores concerned have yielded such entirely unexpected results that the cultivator has been unable to satisfy himself of the origin of the plants obtained until a second sowing has convinced him by similar produce. Thus in the case of the Jones and Fox wonderful plumose Shield ferns, spores were sown from a wild decomposite or merely tripinnate form, the result being a batch of such finely dissected and feathery varieties, so widely differing from the parent that their origin seemed an entire mystery, until a second sowing from the same plant revealed the fact that its spores were endowed with the capacity of surpassing it to that extent, a similar lot arising.

These, however, resembled each other closely, varying only in fineness of cutting or density of foliage. Another form, however, known as Pearson's decompositum, while producing also a beautiful plumose form far surpassing it in delicacy and foliose character (*Polystichum angulare divisilobum plumosus* Pearson) regularly produces, in conjunction with a percentage of this plumosum and a number of the parental form, a very remarkable and distinct form of "grandidens," which no one ignorant of its origin could possibly impute to such a parent. In this the fronds are narrow, the pinnæ being short and somewhat irregular, while the pinnules, instead of being extra feathery, are all reduced to short pointed spikes, so narrow that the abundant fructification shows on the upper side of the frond. A greater contrast could not be imagined than there is between this and plumosum, and yet both forms arise from spores from one and the same frond or even pinnæ.

Here it will be observed a character comes into evidence of which there is absolutely no trace visible in the parent,

which is in itself a thoroughbred constant form, with no eccentricities at all to which such results could be imputed by inheritance. Yet by repeated sowings it has been proved that the three forms—the parental, the plumose and the “grandidens” type—arise in more or less the same proportions whenever the decompositum spores are sown. *Pteris aquilina percristata* is another fern which constantly produces two different varieties when sown—viz., the parental form quite truly, and a large percentage of “grandiceps,” a quite barren variety, with the fronds consisting entirely of stalks and heavy crests, these also being quite alike. This being barren, it can only be propagated by sowing spores of the parental form when it is quite sure to appear again.

The superbum section of Lady Ferns arose first from a beautifully crested seedling raised from an entirely uncrested form (*Athyrium filix femina elegans* Parsons) raised from an equally uncrested wild find (*A. f.f. plumosum Axminster*). In this case the extraordinary feature was that over 90 per cent. of the same batch were crested also, only two of the parental form resulting, while most of them were more or less defective, only two being perfect, though no defects are visible in either parent or grandparent. Spores of the better of these two (superbum) being sown, the next unexpected result was the appearance of two distinct sections, one uncrested and extra plumose, and one crested on varied lines, some to the fourth degree (*percristatum*). Here again was a sudden divergence of type in two distinct directions in spores gathered from one and the same plant.

In the more recent case of *Polystichum aculeatum pulcherrimum* a similar divergence took place, some 20 per cent. of the plants assuming a quite distinct type, “gracillimum,” in which half-inch pinnules were lengthened to two to three inches, quite transforming the plant, while one plant assumed a decomposite plumose form of quite distinct character, rivalling those of the Jones and Fox

angulares. A subsequent sowing from another plant (of which the first was, however, a division) is now yielding the same results, so far as the gracillimum type is in evidence, though the possibility of further divergencies is evidenced by a very promising diversity in other directions in the young seedlings.

In *Blechnum spicant*, a long narrow variety (*strictum Hartley*) has in successive sowings yielded a percentage of a very dwarf congested variety (*crispissimum Hartley*), quite the antithesis of the parental form. Doubtless if fuller records had been kept regarding the origin of new forms, other cases could be cited ; but there is no doubt that the above embrace the most remarkable. It will be noted that in every case Nature has started the ball rolling by providing an abnormal sport. Most of the types in cultivation are due to such, though the selective cultivator may have enhanced the original types through their spores. The plumose types, however beautiful, are extensions of Nature's "decomposite" inventions ; but so far, with the exception perhaps of the mysterious *A. f.f. Kalothrix*, we must credit the selective cultivator with the gracillimum type of Shield ferns which are here described.

CHAS. T. DRUERY, V.M.H., F.L.S.

A NOTE ON PTERIS AQUILINA CRISTATA.

I have been commanded by the Editor to send in a note on my plant of crested bracken, which he pronounces to be a thoroughbred. Its main interest appears to be its independent origin. It arose, in my greenhouse, on some peat, of which I had brought a little from Woodham Walter Common, near Maldon, in Essex. This is a patch of undulating land covered with oak coppice, occasional birch and holly trees, and an abundance of ling and bracken. On the Common itself I have never found anything more than the merest bifid tips to the bracken. Mr. Druery naturally raised the question of a chance spore getting on

the peat from a possible "*cristata*" in my possession, or in my neighbourhood. I think I am able to prove conclusively *my* non-complicity in the "design" on the unadorned simplicity of *P. aquilina*. At the time my seedling appeared in the greenhouse, some five years ago, I had not a single plant of varietal bracken in my possession, nor am I aware of any in neighbouring gardens. The nearest place I know, also, as a local haunt of the wild *P. aquilina* is some miles away from my garden. Personally, I feel convinced that this is another instance of a big jump in varietal character from a practically normal stock. My patch of this plant has produced spores freely for some years now, so I have been enabled to raise seedlings. Amongst them, the "*grandiceps*" type forms a small percentage. The latest raised plants also shew a tendency towards ramose fronds, so I am hopeful of obtaining from this stock counterparts of most of the crested forms already known to us.

FRAS. W. THORRINGTON.

SPLEENWORT CULTURE.

The successful cultivation of the British Spleenworts under glass presents difficulties which are not experienced with most of the other genera, and a few words, therefore, on a chance discovered method by the writer may be welcome. Some years ago, after a visit to my collection by some friends who evidently did not grip the fact that variation was an essential therein, one of them sent me from Scotland a bunch of quite normal *Asp. trichomanes*. On receipt I was somewhat in a quandary, as I did not want them and did not like to throw them away. They came in a bundle tied up with the roots in moss, and having a tumbler handy I crammed them into the tumbler, moss and all, so that some of the loose moss just reached the bottom. Naturally, I watered the moss, and a little water percolated through and remained at the bottom of the

tumbler, which was stood out of the way on a shelf. Much to my surprise, growth commenced and proceeded rapidly, and now, two years later, there is a strong healthy growth; quite a pretty specimen. Regarding this as a wrinkle worth following up, last year, when I received a somewhat curious form of the species from one of our members in the shape of a small, and by no means strong plant, I resolved to test both the plant and the new system. I therefore installed it with a little soil in the middle of some moss, and crammed the mass into another tumbler in the same way. It immediately started healthily, and at the present moment is a beautiful strong specimen, showing very peculiar characters of subimbrication and partial subdivision on quite distinct and interesting lines. Encouraged by this, I treated an almost moribund plant of *Ap. fontanum* in the same way, and this, to my delight, is recovering rapidly, while a seedling *Asp. lanceolatum* transferred when at the point of death, crammed into the moss at the edge of the tumbler, but just in contact with the thimble pot-full of soil in which the *fontanum* was installed, has sent up two or three fronds on the healthiest possible lines. By this system it is clear that the living moss induces a circulation of moisture and permits an aeration of the soil which is very congenial to such species as those concerned. The moss, be it noted, does not fill the tumbler, about an inch is left at the bottom, where a little water remains to be drawn upon as required by the little wisps of moss which reach it. Now and again, when this water disappears, the tumbler is immersed in water to the edge until it is full, it is then reversed and the water run out, until only a little is left as before. On one occasion the normal specimen originally installed was forgotten for so long, that all the fronds, old and new, were curled up and withered, as occurs on its native walls during a long drought. A few hours entire immersion under water, however, restored it completely, precisely as would be the case when soaking rain succeeds a drought. This method involves a minimum

of trouble, watering is only required at long intervals, the tumblers can be kept clean outside and with the growing moss inside and the pretty ferns surrounding them look far better than pots. We strongly recommend further experiments in this direction to our members, especially with *Ceterach*, which remains yet to be experimented upon, and is a by no means easy subject to deal with.

C. T. D.

FERN HUNTING.

During the holiday season a great number of visitors to the country amuse themselves by collecting ferns, and on their return to town we may see on the railway termini the primary results of their quest in the shape of baskets, hampers and bundles of ferns mingled with their luggage, indicating a taste for the natural beauty and grace of these pretty plants. Looking, however, backwards and forwards from this particular point of view, we shall become aware of two very serious drawbacks to the true fern lover's appreciation of such popular Fern hunting. In the first place, if we examine the ferny sources whence these plants have been derived, we shall frequently find them ravaged and despoiled, and it may be even entirely denuded by remorseless and repeated raids. Too often we may find abundant evidence that the plants have been rooted up at one place only to be thrown away at another, when through utter lack of care they have become wilted and unsightly, while invariably at places of popular resort, even in our ferniest counties, we must travel far afield to find the ferns in anything like their natural robustness and beauty. So much for the backward aspect of these Fern hunting expeditions, which embraces, as we see, a very large admixture of that vandalism which is gradually denuding the country of many of its rarest and most precious native plants. As regards the forward view, *i.e.* the fate of such acquisitions, were it the case that the ferns thus removed were carefully and appreciatively tended when they reach their

destinations in town gardens, so that eventually they displayed their beauties there to the best effect the environment permitted, we would say nothing against their collection, but it is safe to assert that not one in a thousand has such an opportunity, and that the vast majority perish entirely for lack of attention or care in planting. The "tripper" fern hunter unfortunately is not the only sinner; there is the resident village collector, who advertises in the horticultural press and raids the seedlings for a mile or so around to supply the demand induced by cheapness and the beauty of the plants; and there is the wholesale vandal, who raids the district with a horse and cart and sacks galore and supplies the market dealers by the thousand, leaving desolation in his track. Happily, of late years, the law has stepped in to emphasise the property rights in these plants and to punish those who steal them in the several ways indicated, a measure which has had marked results in many ferny localities.

The curious fact, however, in this connection is, that from the true fern connoisseur's point of view the great bulk of this so-called fern hunting is energy entirely misplaced. Not one in ten thousand of the so-called fern hunters knows what he or she should really look for, and is aware that here and there where ferns grow freely there are scattered among the common or weed forms others which are quite distinct and very much more beautiful or curious. These are of the same species as their fellows, but Nature in some occult way has not only shaped them differently both generally and in detail, but in most cases has stamped this difference so deeply in their constitutions that they reproduce themselves truly from their spores, or if they vary, do so in such a way that much improved forms can be obtained by selection. The result of this capacity to sport is marvellous. A complete collection of varieties of over forty odd species of British Ferns would consist of at least two thousand distinct ones, of which the majority have been found wild in our hedgebanks, glens and ferny

woods, or on our wild moorlands and hillsides, from Land's End to John o'Groats, and in the sister and Channel Islands. Naturally these wild sports are not so common that a merely superficial search will mean a good "bag;" it is, on the contrary a case of one in many thousands, so that the connoisseur fern hunter is glad if a day's or even a week's hunt results in a single really good thing, although as a matter of fact the writer has rarely devoted a day to careful hunting without finding something distinct and worth taking home. Naturally such "finds" present themselves in different guises, they may be mere seedlings in which it is only the experienced eye which can detect any promise, or they may be old-established plants. Two of the writer's best finds, for instance, consisted of a tiny plant an inch or two high, and a huge clump of thirty-three crowns, which required the assistance of two men to lift and a horse and cart to transport. As a general rule these "sports" are solitary, or, if there be more than one, the others are obviously the offspring either by offset or spore of the same progenitor. They may betray their presence boldly, or by the mere projection of part of a frond from a mass of common ones, or they may be entirely hidden and only discernable by pushing asunder the foliage of their companions. In any case, he or she who aspires to be a fern hunter of this class must be prepared to be patient and persistent, and be also thoroughly well acquainted with the common forms of the species, so that any difference may be noted. As a rule, the successful fern hunter commences by a more or less chance find, which appears to be essential to infuse the necessary faith in the existence and discoverability of such sports into the beginner, but once this has happened the fern "fever" is caught and the student speedily becomes the enthusiast. The main point to bear in mind is that wherever ferns are growing there is a chance of a find, and some of our own finds have turned up where plants were few and far between. So much for the hunting. And now for a word or two on the quarry. It

will be asked, How do these "sports" differ from the common ones? This could only be answered clearly pictorially, for they differ in many ways. The more general form, *i.e.* the one into which most species have sported, is that of the tasselled or crested section. Normally fern fronds and their side divisions terminate in points, blunt or acute, as the case may be, but in a very large number of species "sports" have occurred in which these points are multiplied so as to form tassels, and as this capacity is usually inherited and often varies in extent in the offspring, selective cultivation has given us some very beautiful forms indeed, derived in every case, however, from a wild sport to begin with. It is, indeed, one of the peculiar features of the Fern hunting we are considering that we are indebted to Nature for nearly all the types of variation, the original designs, so to speak, and all we can do when we find marked forms is to sow them and select those which show this form on still more marked lines, and so improve it. Another type or class of "sports" consists of abnormally divided Ferns. The common *Polypody* of the hedgebanks and old wall tops, for instance, is only once divided, each frond being like two bluntly-toothed combs set back to back, but quite a number of varieties have been found wild in which the teeth of these combs are themselves toothed, or even divided and redivided so as to lose all resemblance to the common type, while being much more beautiful. Ferns also sport in many other ways, in shape of subdivisions as well as number, in habit of growth, and also in size, some being tiny dwarfs, little gems of compact verdure, while others are extra robust, so that with all this diversity of size and make it is obvious that it is nothing less than absurd to fill rockeries with some three or four species, all normal and all alike, and dignify them with the name of Ferneries, as is so often done. Our point, however, is that wherever ferns grow wild it is well worth while to carefully examine them individually as far as possible on the chance of coming across one of these "sports." They

are by no means so rare as to render the search all but hopeless, and when found, even if they only be curious instead of high-class thoroughbreds, they form souvenirs, while if they be new, the gratification is, of course, infinitely greater. In any case one thing is certain, and that is, that once a decent "find" has been secured, the finder will never dream thereafter of carrying home a bundle of common ferns indiscriminately collected, but will leave these religiously alone, as Nature's raw material, for the "prizes" he has now learnt to look for, and consequently there is one Vandal the less.

CHAS. T. DRUERY, V.M.H., F.L.S.

SUPPLEMENT.

For the guidance of new members we would call their attention to the following reports and records of interesting papers read at the Society's meetings prior to the institution of the *British Fern Gazette*. These can be supplied at 6d. per number, or the set of eleven for 4s. These would make an instructive volume. We append thereto the "Contents" of the eight numbers of the *Gazette* preceding the present issue. These also are available (but to members only) at same price, viz. 6d. each or 3s. the set of eight. Orders and remittances should be sent to Editor.

REPORTS AND RECORDS, 1894—1905.

1894 and 1895. "Selective Culture." By C. T. Druery, V.M.H., F.L.S.

"Some Results of Fern-Hunting in Ireland." By W. H. Phillips.

"Notes on some Irish Finds." By R. Lloyd Praeger, B.E., B.A.

"Fern Reproduction." By C. T. Druery.

1896. "The Marvellous Side of Fern Life." By C. T. Drury.
- "Weissmann's Theory of Heredity and its Relation to Fern Life." By Dr. F. W. Stansfield.
1897. "The Ferns of the Diamond Jubilee." By C. T. Drury.
- "Fifty Years' Varietal Development in British Ferns." By Dr. F. W. Stansfield.
1898. "Ferns as Pet Plants." By C. T. Drury.
- "Fern Growing in the Towns." By W. H. Atkinson.
- "*Polystichum angulare proliferum*—Past, Present and Future." By W. H. Phillips.
1899. "Own Finds and Specialities of British Ferns." By C. T. Drury.
- "*Lastrea filix mas*, its Past and Present Divisions." By W. H. Phillips.
1900. "The Growth of a Hobby." By C. T. Drury.
- "My own Finds of British Fern Varieties in the Lake District." By G. Whitwell.
1901. "The Culture of some Difficult British Ferns." By Dr. F. W. Stansfield.
- "*Scolopendrium vulgare*, its Varieties and Culture." By C. B. Green.
1902. "The Lady Fern" (*Athyrium filix fœmina*). By C. T. Drury.
- "A List of Finds by Various Members."
1903. "The Study of the Abnormal." By Dr. F. W. Stansfield.
- "Varietal Types of British Ferns." By C. T. Drury.
- "The Propagation of Varieties of *Lastrea montana*." By C. T. Drury.
1904. "The British *Polypodies*." By C. T. Drury.
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- "Correlation of Characters in British Fern Varieties." By Dr. F. W. Stansfield.

BRITISH FERN GAZETTE.

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. . . The . . .
Humorous Side of Horticulture.

A little nonsense now and then
Is relished by the wisest men,
And even Solomon, no doubt,
Was not a solemn'un throughout.

"My sun Bill sez the Tatur Disees is bound to be
sumthin of a cacchy natur."—*Willyum Grubbins.*

"The Tatur Disees"
and Other Essays.

BY

WILLYUM GRUBBINS,
with further matter (wise and otherwise).

COLLATED BY

CHAS. T. DRUERY, V.M.H., F.L.S.,

Author of "The New Gulliver, or Travels in Athomia," "Versatile
Verses," "The Rocking of the Lilies," "Choice British Ferns," "The
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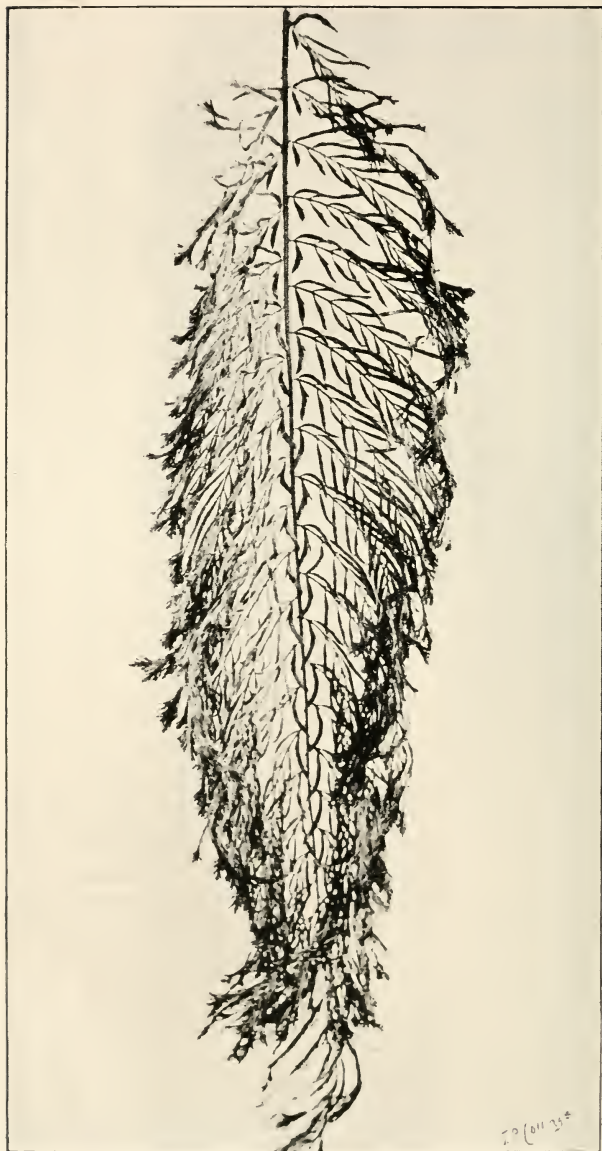
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P. ACULEATUM GRACILLIMUM DRUERY.

(Full Development.)

THE BRITISH FERN GAZETTE.

VOL. I.

DECEMBER, 1911.

No. 10.

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EDITORIAL NOTES.

The Editor is happy to announce that from all quarters he is continually receiving most gratifying letters of appreciation regarding the "Gazette," while new members are swelling the ranks of its subscribers on fairly satisfactory lines. Fairly satisfactory, however, by no means realises the Editor's ambition, and he begs the present members once again to aid him to the utmost by bringing the "Gazette" under the notice of their fern-loving friends, or at least providing him with the names and addresses of such, so that he may send them a specimen copy and do the recruiting himself. The list of members given in the last issue contrasted with that available at the outset of the "Gazette" idea, little more than a score, puts him, it is true, on the right financial side, but it still leaves him no margin either for the extension of the letterpress or of the illustrations which he has in view. The subscription of five shillings per annum, entitling to membership and consequent association with a large number of fellow

hobbyists, plus four issues of the "Gazette," is surely moderate enough for anyone inspired with a sincere interest in the marvels of our Native Ferns, while every increase in the numbers is a step to that improvement of the "Gazette" itself, and consequent personal benefit, to which allusion is made above. All communications should be addressed to *The Editor, 11, Shaa Road, Acton, London, W.*, WHO WOULD ALSO BE GLAD TO RECEIVE ANY OUTSTANDING SUBSCRIPTIONS FOR THE CURRENT YEAR. As regards the matter of the present issue, we have been again favoured by Mr. C. B. Green with a most interesting paper on the Shield Ferns, and also a contribution from the Rev. W. Kingsmill Moore on the Polypodies. Practical papers like these, or suggestions for same, are always welcome to

THE EDITOR.

OUR FRONTISPIECE.

The frontispiece to No. 1 represented a frond of that remarkable strain of *P. aculeatum pulcherrimum* (gracillimum), to which we have alluded on several occasions, and to which Mr. Green's article in the present issue also refers at length. To give an idea of the possibilities of this strain, we reproduce a photo, kindly taken and supplied by Mr. Green, of a frond which had developed on another plant in the Editor's fernery, and which shows the cristulate character developed on a much finer scale than before. It is a curious fact that while in the parental plant *P. ac. pulcherrimum*, a piece of which is depicted on p. 4 of No. 1, the pinnae adhere to the specific form by bearing pinnules, which gradually decrease in length as they taper off towards the slender tip of the pinna, in the "gracillimum" section they get longer and larger, and in addition follow out the same plan by expanding at their tips into pinnuloid growths, which go far to imitate crests, though not produced as with crests proper by any ramification of the midrib. The result is extremely beautiful and unique, as

our frontispiece shows, and appears to characterize in a greater or less degree, all the plants of the gracillimum type as they reach adult size. C. T. D.

SOME POLYSTICHUMS; SPECIES AND VARIETIES.

The genus *Polystichum*, as regards species, constitutes a very small, but interesting group of British evergreen Ferns. The two or three species—for doctors differ—into which this group is divided, fortunately for specialists, abound in varieties of the most beautiful description. The term *Polystichum*, it may be as well to emphasize, is compounded of two Greek words—*polys*, many, and *stichos*, order—which terms refer to the numerous and orderly array of the lines of sori, which are so freely distributed over the backs of the fronds. The common name, Shield Fern, has reference to the round or shield-shaped indusia, which cover the spore cases, and which have a central attachment. The common name, however, is really a translation of *Aspidium*—another name for the genus—which is derived from *aspideon*, a little shield. Hence we get *Aspidistra*, a favourite room-plant, which is often grown in association with Ferns, in fact, I have a pot in which some self-sown spores have developed into nice little plants. Here the same etymological idea prevails with two distinct classes of plants. If, however, I seem to lay stress on this fact, it is only because a knowledge of the one is a great assistance to the understanding of the other.

Having thus disposed of some encumbrance, so to speak, in regard to nomenclature, which I know is a stumbling block to many, the most useful thing to do now is to proceed to a description of varieties. But as varieties are also subject to technicalities, I would like to point out that common names are often misleading, whereas scientific ones should spell accuracy, definition, and absolute identity. Personally, I have respect for technical terms; to me they

are aids to memory, lessons in elocution, and guides to orthoëpy. But as I may be peculiar in this respect, I will now cast away the shadow for the substance, and the substance in the *Polystichum* world is representative of an enormous number of concrete examples. Here again, before we can deal with varieties, we must refer them to their respective species. And what are varieties but variations, or departures from the normal?

As I know least about *P. Lonchitis*, it will be as well to dispose of that first. That I have not succeeded with this Fern is not, perhaps, remarkable, when one considers its alpine proclivities. These are very difficult to imitate at lower levels, and in a vitiated atmosphere practically impossible.

It is, however, a neat little Fern, with *spear-like* rigid fronds of pinnate character, and is usually called the Holly Fern. It was not known as a British Fern when Ray published his "Catalogue" in 1670; although in the second edition of his "Synopsis" he adopts the name of *Lonchitis Aspera Major*, or "larger rough Spleenwort, with indented leaves." He says, "It issues from clefts in the rocks on the tops of the mountains of Wales, as at Clogwyn-y-Garnedh-y-Grib-Goch-Trygvylchan!" A Welsh member, perhaps, can supply the key, and possibly also the habitat. Anyhow, the species itself is interesting, while the two varieties, *cristatum* and *imbricatum*, are little gems, and are self-descriptive.

We now come to another species—*P. aculeatum*, the Hard Prickly Shield Fern. This species may not inappropriately be regarded as a magnified form of *P. Lonchitis*, for a frond of the latter may well be taken to represent a pinna of the former. However, it is a Fern of splendid possibilities, especially in regard to one of its varieties. It is also a Fern of robust constitution, and differs from *P. angulare* in several particulars, which, however, are more technical than practical, for it is easier to distinguish between the growing plants than to define their characteristics. Hence

in "high places" *angulare* is regarded as a variety of *aculeatum*. To me this seems quite an obverse arrangement, as here, except in Scotland, *aculeatum* is considerably less common than *angulare*. For garden purposes, however, they are sufficiently distinct, and we may so regard them.

P. aculeatum, then, although less profuse in the matter of varieties, has produced a few—or at least one—of surpassing merit. That one—*pulcherrimum*—has hitherto been described as "an unique beauty." But what shall we say of its progeny? Well, I think we must "wait and see"; for they are still developing, and unfolding more charms, "Horatio, than are dreamt of in your philosophy." As a matter of fact, the *full* capacity of the variations has yet to be recorded. But as this "beautiful" Fern—and its progeny—has been fascinatingly dealt with from time to time in the pages of our much-appreciated Gazette, I merely refer to it *en passant* as a part of the subject I have been asked to promote. (See frontispiece No. 1 and part of parent form on p. 4, also frontispiece of No. 3, B.F.G.)

And yet, as second thoughts are often best, and as a recent visit to Mr. Druery's Fernery compelled my attention to one of the progeny, I feel forced to refer to this one as an improved form of *gracillimum cristulatum*, a certificated plant (*vide* frontispiece). That this is capable of still further "cristulation" is really remarkable; and yet the plant in question has pinnules from two to three inches long, capped with broad sub-crests—a sort of pinnuloid growth forming pseudo-tassels! The pinnæ are about six inches long, the fronds lax and graceful, while the Fern, taken as a whole, is extremely handsome. In fact, like Romeo, one is inclined to ignore the beauty of Rosalind for the greater charms of Juliet. Another of the same type occupies a good deal of air space, for it has a spread of five feet over and a full set of fronds.

Other varieties are *acrocladon*, *capitatum*, *corymbiferum*, *cristato-gracile* and *grandiceps Abottæ*, all of which are more

or less crested, as well as distinct and beautiful. *Densum* is another fine foliose form, while *hybridum aculeato-cruciatum* is one of the late Mr. Lowe's remarkable crosses between *P. ang. Wakleyanum* and *P. ac. densum*, which ought to go a long way towards the argument in favour of unity of species. This plant, however, is more curious than beautiful—hence one might reason *per contra* and vote for purity of species.

The third species of *Polystichum*—or well-defined garden form—is *P. angulare*. Having already commented on the disagreement of botanists in the relation of this with *aculeatum*, I will merely add that, in normal specimens, their distinctive characters are sufficiently clear for our purpose. Apart from technical differences, however, *angulare* is more soft and delicate in texture and more pendant and elegant in habit.

As to the varieties, they are so numerous that I cannot pretend to deal with a tithe of them. In E. J. Lowe's little book 394 varieties are recorded; in "The Book of British Ferns," by Mr. Druery, about 180 forms receive attention; while in the latest publication—"British Ferns and their Varieties"—also by Mr. Druery, the author has endeavoured to slightly curtail this number—to choose, in fact, only the very best. As, however, there are still too many for me to manipulate, I will content myself by dealing only with those that I can recommend. Out of so large a number, even of good things, one has perforce to be eclectic—to pick and choose to suit one's own accommodation and requirements.

At the outset one is confronted with some good things in the *acutilobum* section. Here the fronds are much divided and the lobes acutely pointed. There are forms of Gray, Hartley and Phillips, and many more of bulbiferous character. These are perhaps better known outside the cult on account of this proliferous habit. They are propagated by the trade, and seem to find a ready sale, for one often comes across them. This proliferous peculiarity, however, is not confined to this section, as all Fern-growers

are aware. Then we have the *multilobum* section, among which there are some very fine forms. Here the pinnules are divided into rounded lobes and the fronds assume a tripinnate character.

At Kew both sections are well represented and looked wonderfully satisfactory in October last, the season notwithstanding. I particularly noted *tripinnatum*.

C. B. GREEN.

(To be continued.)

"ROUND MY FERNERY."

One of the chief delights of the Fern lover who possesses a good collection is to receive a visit from a sympathetic and appreciative fellow hobbyist and to take him round, and, without a fear of boring him, dilate upon the peculiarities and the histories of his specialities and acquisitions. In this way there is always something to be mutually learnt by the comparison of experiences, and although it is not quite the same thing to address such sympathetic spirits by mere pen and ink, in the absence of the precious pets, the ferns themselves, there is a pleasure in undertaking such a task, and quite possibly a sympathetic one is evolved on the part of the reader or readers. My Fernery then, or rather my collection, consists of three departments, viz. a cold conservatory on the north side of the house about 23 feet by 14 feet, a garden about 80 feet by 30 feet, and a spare north room in the dwelling house, in which there is a Wardian case for spore culture. In the conservatory, in some 500 pots of various dimensions, there are some hundreds of the choicest varieties mostly of the more delicate structural kind which are the better for protection, while in the open there are some hundreds of plants, embracing a large number of Ferns, raised from spores and otherwise acquired, which better stand the influence of sun and wind. The first thing we note on entering the conservatory from the house is an immense plant of the original *A. f. plumosum* Druery, four feet high

and more through, the beautiful cutting of which must be seen to be appreciated. In the corner to the left is the "King of the Male Ferns" (*L. p. m. cristata*), with an eighteen-inch trunk, due to constant suppression of lateral off-sets, which we have had over thirty years, and in the opposite corner a larger but trunkless specimen of *L. p. m. polydactyla* Wills. Behind this, on a shelf, stands a half-round cork receptacle with a roofing-slate back, in which, for at least twenty-five years, a Lady Fern of the well-crested *Craigii* persuasion has thriven without any change of soil save now and then a handful or two by way of mulch to make up for shrinkage. From holes left in the cork a number of self-sown seedlings of several species protrude and thrive without detriment to the Lady Fern aforesaid, a curious example of persistent growth without special attention, division, or shifting, for an extended period. At this end of the conservatory, as companions to those named, there are arranged on a series of step shelves or supported on drain pipes as space demands, a fine specimen of the original *A. f.f. Victoriae*, the original *A. f.f. percristatum* Cousens, an immense plant about five feet across of *P. ang. plumosum Grimmondii* on the lines of the Jones and Fox plumosums, a division of the original *P. ang. acrocladon* received from Mr. Mapplebeck the finder, a few of the choicest *Drueryi percristatum* Lady Ferns, an immense specimen of *P. aculeatum pulcherrimum*, and last, but by no means least, an original division of *A. f.f. Clarissima Jones*, upon which apospory was first discovered by the writer. In and among these are smaller examples, including *L. p. m. fimbriata cristata*, *P. ang. percristatum Moly*, a charming fern with evenly-crested pinnules, and Moly's *P. ang. grandiceps*, a particularly fine seedling form, while on shelves there are several pans full of the new and promising brood of *P. aculeatum gracillimum Druery*, which so unexpectedly sprang from *P. aculeatum pulcherrimum* a few years back, as described in the first number of our "Gazette."

We now descend a step into that part of the conservatory which represents an extension of the short one originally built, and to which we have adverted above, and here we find a large oblong central step-staging with lateral step stages all round with red tiled pathways between and a wide shelf across the end, which is entirely of glass, while the sides are of wood or brickwork for half their height. The chief ornaments in the centre consist of another huge specimen of *P. acul. pulcherrimum*, the actual parent of the new batch in question, Wollaston's *P. ang. cristatum* No. 10, a gem of first water, and also one of *A. f.f. plumosum Druery*, the latter a single crown division of the original, Wills' *A. f.f. plumosum*, a presumed cross of the writer's effected between *A. f.f. percristatum Cousensii* and *A. f.f. Kalothrix*, but only suggesting the influence of the latter by its elongated pinnules, the original *A. f.f. superbum*, from which sprang all the "superbum" strain now so prominent among the *elite* of the Lady Fern tribe, including *plumosum Druery* itself, several choice descendents of same, *L. p. m. ramosissima*, *L. f. m. polydactyla Dadds*, a grand *Scol. v. crispum* (Stablerae), *S. v. sagittato grandiceps*, a curio with a sort of triple bunch crest on the top of a bare stalk, raised by the writer from a merely *subsagittate lobatum* (one of nine all alike), Mr. Alexander Cowan's beautifully crested *Pseudathyrium alpestre*, several fine *plumose Polystichums* of the Stansfield strain and a score or two of other interesting varieties on a smaller scale, including a mottled crested Lady Fern, presumably a *Cousensii* seedling, but variegated. This central group is very interesting, and we may here indicate an essential point in its arrangement and that of the other shelving around it, viz. that all is so arranged that every plant is within easy reach, experience having taught us that otherwise it is not only difficult to examine and appreciate, but sooner or later plants of difficult access are bound to be neglected. On the left hand shelving there are particularly arranged specimens of interest as our own finds or raisings, and practically every one has its history

as such. The most prominent plants are naturally a row of now finely developed specimens of *P. aculeatum gracillimum Druery*, probably of full size in several instances. These have turned out to be, not merely of quite unique beauty with their long lucent surfaced pinnules an inch or two long, but as having a fine robust constitution. No two are precisely alike in make but all are peculiarly beautiful, a symmetrical circlet of characteristic fronds nearly a yard in length is a sight to be seen. About half a score of these, including a specimen of Mr. C. B. Green's "plumosum" of like origin, but on very different lines, are ranged along this side, and only interrupted by a grand specimen seedling of *P. ang. Baldwinii*, with perfect tips and without a blemish. This, unfortunately, though raised from spores gathered by ourselves from the original finely dissected form, does not repeat the parent, but only rivals, or perhaps excels, in constitution *P. ang. d. p. densum Jones and Fox*, whence, according to Mr. E. J. Lowe, *Baldwinii* arose as a bulbil. Along the shelf upon which these gems are elevated are a number of Hartstongue finds of our own and one or two specimens of that unique gem *L. p. m. pericristata apospora*, any portion of whose delicately fringed and tasselled fronds, is capable of producing an indefinite number of plants by associated apospory and apogamy, first growing out into Prothalli, while these almost immediately bud out into the parental form, the usual slow sexual process being omitted. Garnett's aposporous and crested *A. f. f. Clarissima* is here in fine form, but it is quite obvious that space precludes detail of all the specimens.

On the opposite side are grouped the *Polypodium vulgare* varieties, a number of good specimens monopolizing half the length. Along the window at the end are grouped a considerable number mostly of small-growing forms, among which is *Scol. v. Cousensii*, the most marked of the dense ramifying varieties as found wild. Here, too, is our own *spirale, ramoso-cristatum, fimbriatum* and others of the Hartstongue tribe, and, as an exception in size, a fine plant

of Moly's *P. ang. pulcherrimum variegatum*, which is quite unique as a permanently aposporous and symmetrically variegated British Fern. On a second shelf in front of this one is a row of ninety potted seedlings of *P. acul. pulcherrimum*, many of which have declared themselves as future "gracillimums," while among the rest are many promising foliose forms. This lot, and those in pans mentioned above, undoubtedly represent one of the most remarkable batches of British Fern gems ever obtained. The opportunity of watching their development may be ranked as one of the highest rewards a fern lover can desire for his toil and trouble.

At this point we feel we should have been wiser to have headed our notes "A Shelf in Our Fernery" rather than as entitled, so much has been omitted in this necessarily limited glance, particularly as the plants outside remain to be considered. Stepping, then, into the open, we see before us one oblong bed containing a jungle of long-established forms, and in the shadow of the Fernery and the partial shadow of the west wall a similar jungle extends almost the whole length of the garden. Further on, and entirely unshaded, are two wide beds recently established, and in the centre of the lawn there is an oval bed with a large white Lilac tree in the centre, under the shade of which a group of very choice plumose and other Shield Ferns are doing marvellously well. The old-established specimens would appear to be handicapped by the profuse growth of self-sown Primroses, Scillas and, truth to tell, an abundant supply of weeds, and amid which may be discerned much of the débris of old fronds of previous seasons. In point of fact, however, we find that the soil being thus covered forms a great protection against drought, and the very robust character of the Ferns shows clearly enough not only that they can hold their own, but derive an advantage from their untended environment. Even *Lastrea montana* grows vigorously in the full sun, *L. dilatata* and other *Lastreas* attain full size, as do many of the *Athyria*, while Shield Ferns thrive as if in a Devonian Combe.

With the Hartstongues we have for years been terribly handicapped by the Weevil (*Otiorhyncus sulcatus*), particularly under glass, where the beetle in summer destroyed the fronds, and its grubs the roots during the winter, to such an extent that we could never raise a presentable specimen. We have, consequently, contrived two narrow beds in the passage-way between ours and our neighbour's house, and as this is protected from the wind, and also from the sun, save for about an hour in the day, we have transferred our damaged specimens thither, and to all appearances they are taking hold and mean to thrive.

Reading over the above, we find that the *Polypodium vulgare* section has been too briefly treated, especially as, owing to the curious fact that many of the best forms do not start growth until July, they extend the interesting growing and developing season for several months. In pots and pans under glass there is a splendid group embracing all the best, while two large wire baskets mounted on drain-pipes standing in corners, and containing fine specimens of several varieties each, complete the collection.

The Cambricum section is represented by vigorous specimens of the old *Cambricum*, *Barrowii*, *Prestonii* and *Hadwinii*, a smaller-growing variety being, we believe, *Oakleyae*. The crested ones are *bifido-cristatum*, *cristatum*, *grandiceps* Parker, *Forster* and *Fox*, *glomeratum* Mullins, *ramosum* Hillman, *cristatum* Scarborough (received from Mr. Wollaston) and *Cornubiense bifido-multifidum*, a curious cross effected by Mr. Clapham which rings the changes on the normal, the several grades of cutting of *Cornubiense* itself, and all these types with the *bifido-multifidum* blood evidenced by divided tips, all these forms cropping up in the shape of entire fronds, or parts of fronds, in a sort of "anyhow" manner. *Cornubiense* itself figures in its forms of *trichomanoides* and Clapham's plumose cross, and, of course, the old original erratic form is found. *P. v. pulcherrimum*, our own find "*macrosum*," a deltoid, well-cut variety of

a particularly fertile character, *macrostachya*, *longipinnatum*, *servatum*, *semilacerum*, *omnilacerum* and a number of other varieties all figure and suffice to show the wonderful versatility of this species. We must not forget to add *P. v. Robertsii*, found last year as a tiny plant near Barnstaple, and promising to be a very fine form on probably *pulcherrimum* lines, though not yet sufficiently developed to name otherwise than provisionally.

Finally, we may mention three seedlings from the *L. thelypteris polydactyla*, found in the United States, which are developing fine *grandiceps* crestring, entitling them justifiably to election as British-born varieties of that hitherto unvaried species in this country.

C. T. D.

POLYPODIUMS AND DROUGHT.

In most parts of the United Kingdom the summer of 1911 has been rainless. I spent August in Devon and Cornwall. Everywhere the growth of the ferns was affected, often the *Polystichums* and *Scolopendriums* being limp and helpless, like dying animals craving a drop of water.

But the *Polypodiums*, so far as my observation goes, have not only tolerated, but have thriven upon the drought.

In my "Polypodery" in Co. Dublin upwards of twenty varieties flourish. They are in shade and in shelter; but most of them are planted after a fashion which, even in a normal season, involves a minimum of root moisture. Noticing the fern's liking for having its roots in connection with wood, and its love of quick drainage, I hollowed out a number of elm logs differing in height from one to two and a-half feet. Some others, made hollow by nature, were filled with rough stones, which carry off water at once, those hollowed artificially were drained by many augur holes. The result has been a bed for the ferns not far removed in dryness from the top of a wall.

The plan, which was first tried some half-dozen years ago, has succeeded beyond expectation, and many kinds which almost refused to grow before now flourish and give no trouble. This note, however, is concerned not with the general conditions of the "polypodery," but with its behaviour this dry summer. Speaking comprehensively, I may say that these ferns have actually done better in the drought than before. One or two may be a little shorter; this is certainly the case with *P. v. Pulcherrimum*, which usually attains to abnormal dimensions in a tall stump; on the other hand, some are taller, e.g. *P. v. Cristatum Minor* has ceased to be Minor by doubling its usual size.

But all show a luxuriance and fulness of development which I have not noticed before. This is particularly the case with the beautiful *P. v. Trichomanoides* and its near relative *P. v. Elegantissimum*, but it applies more or less to all. Such growth, under such trying climatic conditions, would have been less remarkable had artificial watering been employed, but as a matter of fact the watering-pot has not been used for the *Polypodiums* more than once or twice during the season.

H. KINGSMILL MOORE, D.D.

Cedar Mount, Dundrum.

SOME FERN HOBBY EXPERIENCES.

Every hobby-rider is, of course, particularly enamoured of, and engrossed in, his own special pursuit, and it is a good thing that it is so, since sincere enthusiasm in any direction involving collection and studious research is almost bound to add something to the general store of knowledge by the investigation involved and the facts ascertained and put on record which otherwise might have been lost. There are, however, hobbies and hobbies, and we may legitimately divide them into two categories, the natural and the artificial. The artificial hobby may be described as one which is entirely devoted to human handi-

work or ideas of some kind or other, while the natural hobby deals with the work of Nature, at any rate as a basis, and it is to this class that the British Fern hobby belongs. A natural hobby is absolutely inexhaustible, we can never plunge deeply into it without perceiving that the special branch involved in our studies is part and parcel of the great scheme of Creation, with all its marvellous laws and phenomena, while in a hobby of the other kind, the limit is that of human capacity as contrasted with the infinite. In my * case, perhaps, this enthusiasm has been emphasised by peculiar good fortune, since success, whether the result of chance or that of careful study, is bound to inspire greater vigour in the pursuits concerned.

Chance, indeed, has been the main factor with me in establishing a hobby on successful lines. It was pure chance that a mixed sowing of spores in 1881 should yield two quite different varieties of Lady Ferns, a young seedling of which in each case was dotted profusely with bulbils. That was practically the starting point of recorded observations, and it is a curious fact that despite hundreds of subsequent sowings, it is only this year (thirty years afterwards) that a similar experience has occurred. A published record of this led to other bulbil-bearing Ferns being submitted to me for my opinion, and this eventually brought under my notice the bulbil-bearing pinna of *A. f.f. plumosum elegans*, which in two generations, from its associated spores, gave the wonderfully beautiful and diverse strain of the "*superbum*" *plumosums* to the world. This again was pure chance; I sowed merely to get *elegans*, which I did not possess, and good fortune did the rest. It was to the reputation based on the original bulbil discoveries (and which led the late Mr. Burbridge to dub me "Bulbil Druery") which brought the mysteriously barren and yet apparently sporiferous "*A. ff. Clarissima Jones*" under my notice, and I still vividly remember my repeated remarks to my wife during the investigations I was making in that

* These notes are too personal for the editorial "we."

connection that at last "there was something new under the sun," which indeed, so far as records went, proved to be the case when the new phenomenon of "*Aposfory*" was demonstrated, proved and accepted by the Linnean Society. Who could avoid becoming an enthusiastic hobbyist when so rewarded, not by the acquisition of an inanimate piece of bric-à-brac or a new or old postage-stamp, but by a discovery which enabled me to produce from a bit of a fern frond of a peculiarly beautiful type, and as a barren fern, individually unique, some hundreds of counterparts for wide distribution. In artificial hobbies, as we have defined them, there are, at any rate, no experiences of this enthralling kind. The recent experience with *Polystichum aculeatum pulcherrimum* is another stroke of absolute luck due to nothing but a desire to increase a beautiful parental form, rare because always deemed barren, and a host of far lovelier and quite new varieties is vouchsafed both to Mr. Green, who made a joint sowing, and myself.

Many of my old fellow Fern hobbyists, who, alas! in many cases have joined the majority, have been signally fortunate in another line, viz. that of Fern hunting, adding scores and even hundreds to the list of known and beautiful varieties, by their assiduous search in the districts round about them. These discoveries were mostly favoured by residence in the ferny districts of Great Britain, but I, a Londoner born and bred and constantly resident therein, had but the autumn week or two, and these only in occasional years, to devote to this branch of the hobby, and yet fortune has favoured me again with numerous finds of value as a proof that it is well within the competence of the town dwelling Fern hobbyist to reap success in that direction.

One point I have always borne in mind and recommend strongly to my fellow enthusiasts, and that is not to hide their light under a bushel by failing to record and publish their discoveries or experiences for the benefit of their fellow Fern lovers. This does not involve, or, at any rate, should not involve censure for egotism. Personal experience

always appeals far more strongly to the mind than indefinite hearsay, and it is this conviction rather than egotism, which has dictated this little excerpt from my own career as a fern hobbyist for the possible benefit of my readers.

C. T. D.

VARIETIES AND VARIETIES.

In the study of variation in the Fern world, now that it is known that the number of varieties, natural, *i.e.* wild, and cultural, as resulting from subsequent sowing of spores from wild finds, is practically unlimited, discrimination of what is worth growing and what is not becomes more and more essential. The wild forms, of course, possess the greatest interest as the results of natural evolution since their abnormalities, however curious and in our present knowledge inexplicable, must inevitably be due to some underlying natural cause, some subtle influence in the mother cell within which they must originate. This must be so, since every fern and every part of a fern starts growth with a single cell, which by subsequent division and multiplication builds up a structure which, as a rule, conforms to the specific plan of the plants concerned. We find, however, that if we, as fern hunters, carefully examine a large number of plants in a wild state, departures from the normal specific type are by no means infrequent, mostly, it is true, of a minor, or it may be, partial type; but as we are aware, every now and again examples present themselves of a very marked character indeed, the peculiarities pervading the entire plant, including its reproductive system. As a result of this, not merely is the individual markedly modified, but its progeny is similarly or even more markedly affected, which of course is the selective cultivator's opportunity. Some species we find to be much more constant to the normal type than others. With the Spleenworts, for instance, we may examine thousands, nay, scores of thousands without finding any appreciable departure; while

on the other hand, with the Lady Fern, in many places where it is abundant, there is so much variation in cutting, habit and general detail that it is difficult to match the fronds of any two individuals. In the Lastreas, *L. filix mas* is much given to the production of "rogue" forms, partial forkings and irregularities characterizing some fronds on a plant while the rest are quite normal. *L. montana*, wherever it is found, is apt to produce the "truncata" type, and also varies greatly in width and foliaceousness independently of environment. *L. dilatata*, too, varies so much as to constitute a subject of disputation between botanists, who have considered it to consist of several distinct species, *L. spinulosa*, *L. uliginosa*, and *L. cristata*, though in the opinion of our most experienced British fernists all these are so linked together by intermediate forms that *L. dilatata* should be held to embrace them all, they thus ranking merely as varietal forms and not species proper.

Recurring to *L. filix mas*, however, we consider that Mr. G. B. Wollaston was fully justified in dividing this into three sub-species, *L. filix mas*, *L. pseudo mas*, and *L. propinqua mas*, since each of them has its distinct characters which he has clearly defined and which fern hunters easily recognize. No one, for instance, seeing *filix mas* side by side with *pseudo mas* can confound one with the other, and *propinqua*, with its local distribution and curved pinnæ is equally recognizable, linking forms not being found. *Polypodium vulgare* may be classed with the generally constant, but careful study will show local differences of make particularly in the arrangement of the terminal pinnæ, sometimes tapering gradually towards the frond tip, which at others finishes off with a pinna set as it were on end. All these, however, are minor forms of variation, which are now practically ignored in favour of the really abnormal types which crop up sporadically and are rarely found in quantity. These represent very wide departures from the normal, involving often great differences in structure such as no normal species presents. There is, for instance, no known

ductive system, inducing reversions at one time and adherence to parental type at another. Years ago Mr. Whitwell accidentally raised a number of very dwarf ramo-cristate plants of *Lastrea propinqua* in a sowing of *Blechnum* spores, and these were so diverse from any fern in his possession that their genesis has always been a puzzle. On a visit, however, this season to Messrs. H. B. May's nursery we saw a large batch of precisely similar dwarf plants, all of which had originated from a registered sowing of *L. propinqua crispa*, which is neither dwarf nor ramo-cristate, the parental fern not appearing at all. The genesis of Mr. Whitwell's batch is thus established, but why two such diverse batches should appear at long intervals and not at all in the interim is as great a puzzle as the original one, and must apparently depend upon some seasonal influence which only occurs at intervals. These examples, however, lie a little apart from the moral this article is intended to inculcate, viz. that only thorough-bred symmetrical and constant forms and not sub-varieties or defective types, should be used for selective purposes or given names which will leave an impression of value on the minds of fern students.

Members of the "curio" tribe, unless beautiful as well, should be ignored (except as souvenirs) when found wild. That it is only the best which will engender the best is the motto to be adopted, and whether mentally formulated or not, it embodies the principle that has raised our British Ferns to their present elevation as embracing some of the most beautiful Ferns the world has produced. Half a century ago popular taste for them was, if not killed entirely, rendered entirely dormant, by the exhibition of "monstrosities," whose very defects were made the subject of high encomiums and high prices to fit, while the small comparative number of "thorough-breds" were lost in the crowd. To-day the latter, thanks to enthusiastic collectors and cultivators, are so numerous that the case is entirely reversed, but still we

have to be careful, or the ease and abundance with which the rogue forms assert themselves, and are thus liable to be put forward for sale, may water down the popular interest now felt and revive to some extent the old idea that British Ferns are not worth growing.

C. T. D.

FERNS AND MENDELISM.

I have sometimes been asked whether I considered that Ferns were subject to Mendelian laws of heredity, but although I have no doubt that those laws pervade all organic life and embrace therefore Ferns, it appears to me a matter of extreme or indeed insuperable difficulty to establish this as a fact in the same way as has been so abundantly done in the animal and plant world generally. The reproductive operations of the Fern appear to me to be conducted on such lines as practically to exclude scientific certainty in tabulating results or even in tracing results to definite causes. The well-established fact that when once a fern has "sporting" its progeny are liable to sport again, introduces a disturbing factor, as indeed the faculty of spontaneous "sporting" must do in all Mendelian experiments, by introducing new "characters" which may entirely upset the calculations of the experimentalists. Another grave difficulty is involved in the minute character of the reproductive operations, which renders crossing on systematic lines a practical impossibility. The only line to be followed by would-be investigators is to ignore varieties and to confine their efforts to the crossing of normal forms of species sufficiently closely allied but also sufficiently distinct in character to permit of recognition of such distinctive characters in the crossed progeny should any result. Even here, however, should F_1 , or the first family, produce recognisable results, which it might not, even with a successful cross, since the dominant character usually asserts itself in F_1 , the cross, thus showing that type only,

no systematic second crossing afterwards would be practicable even if the progeny were fertile, and the only way would be to sow again from F_1 , by itself, and trust to the segregation of character in F_2 showing the Mendelian proportions. A further drawback is that ferns are not usually fertile in the first year or two, so that experiments would require a much longer period than, for example, annual peas or other plants which yield a fresh generation every year. In this connection it may be well to record here that an undoubted cross between the *percruciate* *A. f. f. Victoræ* and the bristly *A. f. f. setigerum* was raised by Mr. Birkenhead some years ago, the progeny being of true *Victoræ* form, but bristly like *setigerum*. A sowing from one of these by the writer yielded a number of plants all quite true to the mixed type, a proof, so far as it goes, that in this case no segregation of character occurred on Mendelian lines.

C. T. D.

SCOLOPENDRIUM VULGARE VAR. SAGITTATO-GRANDICEPS.

It is a well-known fact to those who raise *Scolopendrium* varieties from spores that the progeny is very apt to vary considerably, and, although maintaining the particular characters of the parent, to present them in varying grades. The above-named form, however, is interesting as forming a marked exception, although from its history it would have been expected that considerable variation would have arisen. In the first place the immediate parent was found wild in Cornwall as a form of "*lobatum*," a common type of quite normal make save that the tips of the fronds are divided into several. In this case, however, the basal lobes were lengthened and somewhat fanned at their tips, so that it was named *sagittato-lobatum*. As the wild fronds so characterized sent to me bore spores, by way of experi-

ment these were sown. The result, greatly to my surprise, was the appearance among a number of variants, normal or irregularly inheriting the comparatively simple parental form, of nine plants, all alike, in which the flat strap-like specific frond had disappeared, being replaced by three ball-like crests agglomerated together to form one ball-like mass at the top of a long, bare stalk. This evidently resulted from the fingered lobatum terminal of the parent and the fanned tips of the basal lobes having been so modified as to form three heavy crests on grandiceps lines, while these absorbed so much of the energy of each frond that the leafy or strap-like portion became suppressed, the three crests thus being merged into one, though on examination the triple character is clear enough. I therefore named it as above. It is, so far as I know, an absolutely unique form, and has, moreover, on several occasions developed bulbil plants on the frond surfaces.

By way of further experiment I sowed spores, which are sparsely produced, some two years ago. The result has been a considerable batch of plants, every one of which is producing exactly the parental character without any reversion at all to the grandparental type, so that the new character seems to be entirely fixed.

The original batch of nine plants arose, it will be observed, from a sowing of spores from the wild form before it had been under cultivation, taken, in short, from a wild frond, and it is clear that had these spores been scattered the new form might have appeared as an independent find, which nobody would have been inclined to attribute to the actual parent. As a rule, when discovering varieties, it is impossible to find forms in the locality which indicate the probability of step-by-step variation instead of the sudden assumption of a new type in its full development. Obviously, however, in this case, the possibility of such gradings being masked by the extent of the change is not excluded.

C. T. D,

CYSTOPTERIS SEMPERVIRENS (PROLIFEROUS).

I have received from Dr. Stansfield a portion of a frond of this species from Mr. H. Stansfield's Nursery at Sale, near Manchester, on which a large number of young plants with nearly inch-long fronds have been developed from dorsal bulbils amid the spore heaps. Although similar dorsal bulbils are produced in conjunction with the sori on several abnormal varieties of British Ferns—viz. the plumose *Athyria*, *P. vulgare elegantissimum* and *Adiantum capillus venevis* var. *imbricatum*—this appears to be the first instance of their appearance in a normal British species. *C. sempervirens* was found many years ago in both Kent and Devon, but was assumed to be an introduction from Madeira. A full description, however, of a more recent find in Scotland is given in No. 4, pages 79 to 80, of the "British Fern Gazette," which establishes its indigenous character, and the question now is whether it should not be recorded as a distinct native species rather than a mere variety of *C. fragilis*.

C. T. D.

NEW FERN.

The Rev. E. H. Hawkins, of Stroud, has kindly sent me a plant of a very fine *P. angulare cristatum* found by himself five or six years ago at Finure, co. Cork. It is a perfectly constant and symmetrical form, of full size, neatly crested both terminally and laterally. The pinnules are set with fine teeth, giving a suggestion of the percrestatum character, but are not crested. On a well-developed frond the lateral crests are so heavy as to give an elegant pendulous character to the pinnæ. The plant is sparingly bulbiferous and abundantly fertile. As a cristatum pure and simple, it is, I think, at least equal to the very best previously found, and I am not sure that it has an equal in thoroughness, grace and symmetry.

F. W. STANSFIELD,

Reading, September 2nd, 1911.

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THE POLYSTICHUMS.

THE BRITISH FERN GAZETTE.

VOL. I.

MARCH, 1912.

NO. II.

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EDITORIAL NOTES.

Naturally during the winter and dormant season for Ferns we have little to report as to new things, but we present with pleasure to our members a most interesting article from Dr. F. W. Stansfield on that peculiarly interesting section of the Shield Ferns, which has been christened the "pulcherrimums" or the beautiful, which in their best form they richly deserve, but which had their discoverers known of the phenomenon of "apospory," which is a characteristic associated with all the angulares so named, a more appropriate name in the scientific sense would doubtless have been given. We have also been favoured with an interesting and amusing paper by Mr. W. B. Cranfield, relating to what may be termed the "resurrection" treatment of moribund ferns, by virtue of which a large number of Mr. Moly's original and unique finds have been not only restored to life but multiplied into the bargain. We would once more impress upon our members our desire that they will help us with MSS. relating to their finds and experiences, since the

Gazette is expressly founded for the publication of records of this kind for the general benefit, and it is undoubtedly in the power of every thorough-going student of the cult to add something to his or her fellow student's knowledge. Finally, we should be glad if those members who have not yet remitted their subscriptions for the current year, 1911-12, will do so by an early post in response to the request sent herewith. To save reference the subscription is only 5s., entitling to membership and four issues of the Gazette, and such remittance should be made to the Hon. Secretary and Editor, 11, Shaa Road, Acton, W. Finally, once again, we want more members, and a copy of the Gazette will be willingly sent gratis to any Fern lovers likely to join. If each member would enlist only one new one, the Gazette could be greatly increased, both pictorially and otherwise, which is the great objective of

THE EDITOR.

OUR FRONTISPIECE.

In the frontispiece of this issue we give a representation of a group of the most striking forms of the Shield Ferns (Polystichums), the names of which we append. This genus, owing to its thoroughly evergreen nature and the wonderful versatility of its varietal types, to say nothing of the peculiarly feathery beauty of the plumose forms, ranks undoubtedly as the head of the *élite* of the Fern world, so much indeed is this the case that every ardent British Fern cultivator is bound sooner or later to become a Polystichum enthusiast, and hence we make no apologies for the predominance of matter in this issue concerning this remarkable family.

- | | | | | | |
|-----|----|-------------|-----------|--------------|---------------------------|
| No. | 1. | Polystichum | aculeatum | acrocladon. | |
| " | 2. | " | angulare | acrocladon. | [Gray. |
| " | 3. | " | " | brachiato | cristatum |
| " | 4. | " | aculeatum | pulcherrimum | (Pinna
and frond tip). |

No.	5.	<i>Polystichum angulare</i>	<i>Thompsoniae</i>	(Top half of frond).
„	6.	„	„	<i>divisilobum cristatum</i> Ivery (pinna).
„	7.	„	„	<i>pulcherrimum variegatum</i> Moly.
„	8.	„	„	<i>plumosum</i> Pateyii (pinna).
„	9.	„	„	<i>cristatum</i> Wollaston (crest).
„	10.	„	„	<i>grandiceps</i> Talbot (crest).
„	11.	„	„	<i>rotundatum</i> (top half of frond).

THE EDITOR.

THE NARRATIVE OF A RESUSCITATED COLLECTION.

I am induced to put pen to paper, firstly in the hope that others may profit by my experience; in the second place to record the resuscitation of varieties collected by the late Mr. James Moly and possibly unknown to the majority of Fern hunters.

At the outset I desire to acknowledge my indebtedness to the Editor for his assistance and suggestions of treatment, without which the experiments would probably have ended in failure.

For some years I had corresponded with the late Mr. Moly on subjects ferny and otherwise, and a few years before his death he wrote me that, with advancing age and the death of old friends, he was unable to look after his ferns, and offered me his collection. I need hardly say that I at once accepted his offer, but as I was about changing my residence, arranged for the ferns to remain *in situ* until I could conveniently remove them. It was not until August of 1908—an exceptionally hot and dry month

—that I found an opportunity of transferring the collection to their present quarters. I persuaded my wife and one of my daughters to accompany me, and on arriving at Axminster we journeyed to Charmouth by the omnibus which meets the principal trains, and here we met with our first surprise. The coachman, who had to drive a pair of horses, manipulate the brake and handle luggage had lost one arm, but appeared to be able to discharge his duties with alacrity with the aid of one hand and an iron hook attached to the other arm. I am afraid the authorities in some parts of the country would have hesitated to grant a driver's license to an individual so afflicted, but I learned that the coachman had driven the omnibus for years, and was regarded as an institution.

On reaching Charmouth I explained my mission to the proprietor of the hotel, where we had arranged to stay, who bade me joy of my quest. Mr. Moly was regarded as, to say the least, eccentric, leading the life of a recluse, and no woman had been known to pass through his gates, and as my wife and daughter with me were proposing to render me some assistance, this was not encouraging.

The next morning I walked to Langmore Manor House with a view to reconnoitring, but I was not prepared for the task with which I was confronted. What was originally a fern paradise was completely overgrown with rank weeds, brambles and sapling trees, many of which had sprung up through the crowns of old specimens. Huge clumps of apparently dead crowns, standing in some cases a foot above the ground, others prostrate, and the whole place a wilderness of neglect with only here and there cultivated patches. I looked round in despair, and then departed to purchase mattocks and forks, and to find a man to render assistance. That afternoon I commenced operations, and for five days we toiled early and late, commencing a bed and making a clean sweep of everything, as it was hopeless to endeavour to make selections. Seedlings had sprung up everywhere, and in many cases

the choice specimens were completely overgrown. The task completed, the resources of Charmouth were not equal to supplying crates and cases in which to pack the specimens, and I had to go to Lyme for china crates and cases in which to pack the ferns. A quantity of apparently dead crowns were packed in sacks, a local trolly was engaged, and a railway truck chartered, which in due course arrived at Enfield. In a weak moment I decided to pot the whole lot, as being the simplest method of dealing with them, but although from time to time I have started on some tough propositions, I can safely say that this was, in the slang of the day, the frozen limit. Hundreds of pots varying in size from large 48 to 12 in., were filled and carried on hand-barrows distances varying from 70 to 100 yards, and stood in rows on either side of walks through a spinny bordering the garden. The task accomplished, the Editor was invited to inspect the result, and whilst revelling in some of the specimens, did not enthuse over the handiwork, pointing out that in many cases sufficient of the aged caudices had not been removed, and expressing doubts as to whether many would survive the ordeal, having regard to their weak condition. Permanent quarters having been prepared during the winter, the following spring they were planted out, thus receiving a double check. In the result a few of the most robust started with vigour, some made feeble growth, a frond or two only appearing, and in the majority of cases no sign of life was visible. After repeated consultations it was decided that nothing short of drastic surgical operations would save or prolong life, and once decided on it was carried into effect without delay.

The crowns were dug up, and with strong knives the old bases were cut away until signs of life were found in the caudex; in many cases crowns 12 inches round were reduced to the size of a champagne cork, the fragment thus obtained was inserted in a thumb pot plunged in a bed of cocoa fibre and covered with a small glass tumbler, and

when the frame was filled, it was covered with a light after giving the contents a good soaking with water. At one time we had three gross of tumblers so employed.

The varieties treated were *P. aculeatum* and *angulare* *Lastreas*, *filix* and *pseudo mas*, *A. f.f.* and *Scol. vulgare*, the latter being the simplest to deal with, as you can tear them to pieces anyhow, and every piece which has any life in it will grow if treated properly. Taking the *Scolopendrium*s first, a number of Moly's *ramo cristatum* (figured in Jones's "Nature Prints") have been raised from bases. The parent plant was in a very poor condition, but was recognizable (I have also raised from this a number of fine varieties from spores).

Another form of *Scol. v. cristatum* turned up, *Sinum*, various *peraferens*, some fine undulatus, one a giant form, two fine projectums, a crispum called by Moly *splendens*, which Mr. Cordery (Messrs. May's foreman) declares to be as fine as Wills', a robust and broad crispum beautifully marbled with white (which Mr. Moly told me of, but could not find, except that he knew it was growing by the side of a path which was quite smothered up by *Anemone Japonica* and young sycamores), the old plant showing full character, and the young plants from bases an occasional frond, and another *Scolopendrium* with white variegation, which I saw in striking form, but which has not yet displayed more than traces of character. There were also a very robust muricatum, a narrow undulate form called abruptum, and other less interesting varieties. The *Athyrium*s have given poor results, a variety called *Trifidum* by Moly is large and very broad, but otherwise almost normal. Several *sub-plumose* forms have been transferred to hedge banks, and a variety called by the raiser *Miserabile Visu* to the dust heap, save for a solitary specimen retained as a souvenir to mark the frailty of its kind.

In *Lastreas Filix mas* and *pseudo mas* little more than known forms turned up save three interesting grandiceps and crested forms found by Moly at Rousden, Chard, and

Chiddiok, a very foliose and confluent *filiæ mas* of robust habit, forming a handsome specimen, and some so-called variegated forms and a normal form, a giant. The two crested forms of the *Azores L. Dilatata* weathered the storm, and have assumed robust proportions in a sheltered position amongst *Bambusa aurea*, and are to-day (Feb. 8th) carrying, after the severe frosts, fronds quite fresh and green, though prostrate.

It is amongst the *Polystichums* that the gems have so far made their appearance, but many of the *Resurgams* are still too small to show character, so that one may look forward for some time to pleasant surprises. In *P. Aculeatum* quite a number of the *Bevis Pulcherrimum* have appeared. These were huge crowns and were reduced to the smallest dimensions, but hardly one failed to start. Other *Aculeatum*-like forms may turn out to be fine things when fully developed; at present they are too small to determine the varieties. In one case I have some seven or eight plants raised from bases from a very foliose one.

In *Angulare* a fine range of *Acutilobes*, including one called *Laciniare*, which is certainly one of the finest, having fronds this dry season upwards of 3 feet 6 inches long and bearing quantities of bulbils, another nearly as robust, and a very fine form very much like Wills', but more finely divided. Others I may be able to identify this coming season as original finds of other hunters. *Crucipinnulum*, *Flabellipinnulum*, *Concinnum* (Moly's), many *tripinnatums*, one probably and one certainly a grand form christened by the Editor *Falcato Tripinnatum*. In this plant the inferior pinnules are very much produced, assuming a sickle-like outline and being of a very robust habit makes a handsome specimen with fronds 3 feet long. From this I have raised a large batch of seedlings which may show further development. A very bold *rotundatum* of a very dark green colour and leathery texture with large pinnules also attains a stature of 3 feet 6 inches, and of this plant I have a considerable number from the treated *caudices*; several

brachiatums, one uncrested but tripinnate with the brachiate character well developed, the side fronds being about half the size of the central frond; a very handsome and dark coloured *sub-plumosum*, with very broad fronds; several *grandiceps* forms which may be seedlings from Moly's original find, of which latter a quantity have declared themselves. There are also *Divisilobes* not yet identified, and many others which have not yet fully developed their character.

One of the happiest resuscitations was Moly's original plant of *decompositum splendens*, found by Moly in 1875, and from which the late Colonel Jones and Dr. Fox raised the beautiful *plumoso-divisilobums*, *Densum*, *Robustum*, *Laxum*, etc. Mr. Moly particularly drew my attention to this plant, pronouncing it as historic. He related Colonel Jones' visit when he took away spores, and when doubt was cast upon the parentage of the seedlings by the late Mr. Lowe, a further supply of spores was sown with a like result. I believe the exact history was conveyed to the Editor by the late Dr. Fox by letter. The letter was sent to the late Mr. Lowe to convince him of the truth of the descent, and it was either lost or inadvertently destroyed by that gentleman, much to the regret of the sender. Unfortunately there are now none of those living who participated in the triumph. The plant when it came into my possession was in a sorry state. I labelled it Moly's parent, and as such the small plants are still marked. When the first small fronds appeared, it was to all appearances a normal *angulare*, and the Editor was more than sceptical, I might almost say rudely so, of my cherished treasures, but as the strongest of the seven plants began to grow away the character began to declare itself on a few of the basal pinnules until last season one plant assumed quite a different character, and, as it was fertile, I have sown spores which may or may not reproduce the *plumoso divisilobum* section, should it do so there will hardly be longer doubt as to the parentage of those grand forms. Another brand saved from the burning

was *Hirondelle*, a most distinct and graceful plant, so named from the fact of the pinnules being set on in pairs at an angle which, when held up to the light, present the appearance of a swallow in flight. This plant is incorrectly attributed to Dr. Wills in the "Book of British Ferns," as also in Lowe's "British Ferns, and where found," page 123. It is a *Lineare*, and was found by Moly at Hawkchurch. When I thought I had lost the plant, the caudex had decayed and been cut away again and again. I wrote to Moly asking him its history and whether he has ever had an offset. He wrote me, fully recommending a course of treatment, informed me it had remained a single crown ever since its discovery. The Editor came to see me, and I produced the stump of caudex which was then and there reduced to the size of a cigar end. It was thoroughly washed, placed in a tumbler on a bed of moist silversand—which was first thoroughly scalded to destroy spores of confervae—covered with a slip of glass, and put in gentle heat. Within three months three buds appeared, and I have now two plants with fronds nine inches long, but as yet they show no lineare character. I managed to find a few spores on a dried frond that I had preserved and have a dozen seedlings, but they are also in a juvenile stage and time alone will prove them. There are a large number of other Resurgams of which it is only possible to remark that they are developing, and in course of time may have surprises in store. It is too much to hope that a *pulcherrimum* may declare itself. Possibly on some future occasion I may have other discoveries to announce. In the meantime I can only say that watching the development of the erstwhile cripples and moribunds is an endless source of interest. Should any of our members desire to sow spores from any of the varieties I have named, I would be only too pleased to supply them, or possibly send young plants should I have any to spare.

W. B. CRANFIELD.

OUR COMMON FERNS.

THE LASTREAS (NEPHRODIUMS).

As a necessary preliminary to a knowledge of the varietal forms of our British Ferns, whether as natural "sports" or "mutants," or as the result of selective cultivation through the spore, is a familiarity with the common forms which constitute Nature's raw material, and as we cannot expect all our readers to be experts, we intend in this and succeeding issues to give a description of each normal species so as to permit of its discrimination from others. Starting with a genus which embraces the commonest or most prevalent types we begin with

THE LASTREAS (NEPHRODIUMS), OR BUCKLER FERNS.

This genus is represented in Great Britain by six definite species, viz. *L. filix mas*, the common Male Fern, *L. montana* (*Oreopteris*), the Mountain Buckler Fern or Lemon-scented Fern, *L. dilatata*, the Broad Buckler Fern, *L. æmula*, the Hay-scented Fern, *L. rigida*, the Limestone Buckler Fern, *L. thelypteris*, the Marsh Buckler Fern, and three indefinite species, *L. spinulosa*, *L. uliginosa*, and *L. cristata*. In their fertile state, all those may be distinguished by their spore heaps being protected by a kidney shaped indusium, attached to the frond at the point of indentation of this cover, this being the generic character which gives the name of *Nephrodium* (*Nephron*, Greek for kidney), and also the popular name of Buckler Fern to the genus. By remembering this fact, we can consequently immediately determine, at any rate, the genus or family by examining the fertile frond backs. Each species, however, has its individual form of frond. In the common Male Fern (*L. filix mas*) the fronds grow erect and form a shuttlecock-like circle round a scaly brown caudex or rootstock built up of the persistent bases of old and otherwise perished fronds. In the centre or heart of this caudex there are formed the future fronds during the season, only one circlet rising as a rule during the year. This species produces offsets by buds,

latent at first but subsequently developed near the frond bases, and thus in time forms clumps of several crowns. The fronds in the autumn develop a weak point near the base and fall down, disappearing entirely during the winter or only surviving as withered debris. In the spring the new fronds rise and the species may then be distinguished by the uncoiling fronds assuming the form of a shepherd's crook or crozier, the top part hanging loosely forward, while those of the Shield Ferns turn backwards, forming a reversed hook. The Male Fern frond is of lance-like outline, with a bare stalk for some inches when the side divisions begin an inch or two long, and gradually widen up to about two-thirds the length, and then taper off gradually to the tip. The pinnae, or side divisions, are again divided into pinnules which are bluntly saw-toothed on minute lines at the edges. The round spore heaps lie in parallel rows on each side the midribs of the pinnules. The pinnae are flat and several inches long at the widest part of the frond, and taper off gradually to the pinnae tip. These indications should enable anyone to recognize the Fern in its ordinary form. Mr. G. B. Wollaston has quite justifiably separated this species into three sub-species, first the Fern we have described *L. filix mas*, secondly, *L. pseudo mas*, which differs from it in being of lighter colour, tougher texture, robuster growth and evergreen, while the third form, *L. propinqua*, which occurs mainly in hilly districts has its sub-divisions concave, is of a duller green and softer texture, and is quite deciduous. *L. filix mas* is one of the commonest Ferns we have, and is one of the few which appear in thousands of gardens, suburban and other, all over the country, *L. p. mas* is much less common, but is found associated with it, while *L. propinqua* is only common in hilly districts.

L. MONTANA (OREOPTERIS),
The Lemon-scented Fern,

We treat of next, as it is the most easily confounded with the Male Fern, the general habit and make being very

similar. It is, however, easily distinguished on closer inspection by the fronds having hardly any naked stalk at the base, the side divisions beginning close to the caudex as rounded lobes which gradually lengthen as they ascend, until the upper two-thirds of the frond assume the form of the Male Fern frond, the tapering base therefore is the sign of *L. montana*. In addition to this, the fronds are of a yellowish green, and when drawn through the hands a distinct lemon-like scent is perceptible owing to the rupture of innumerable tiny glands on its surface, which contain an essential oil of that odour. The spore heaps are very small and dot-like, and finally when the fronds are uncoiling they do not form a hook but a ball-like mass, whence the tops of the subdivisions protrude like little spikes so as to resemble the spiky ball such as we see at the end of a pole in the hands of Magog in the Guildhall, London. If, too, we examine the caudex we shall find it to be a mass of white knobs and not so definite in shape as that of the Male Fern, the persistent bases of old fronds being less in evidence, while no shuttlecock plan is perceptible. This fern, too, is truly deciduous in the sense that the fronds wither right down in the autumn, and do not merely fall outwards and subsequently decay. *L. montana*, as its name indicates, prevails on mountain sides, where it grows with full exposure to wind and sun, but attains perfection only in more sheltered and moist habitats in the vicinity of streams. It is, however, by no means confined to the hills, but occurs, sometimes plentifully, in damp lowland lanes and woods. We have found it ourselves in Epping Forest, and in the Sussex Forests it exists in abundance. It cannot stand drought or lime in the soil, but otherwise is not very dainty.

L. DILATATA.

The Broad Buckler Fern.

As indicated by both names, the fronds of this species are very broad and quite unlike those already described.

In outline they are almost triangular, the lowest pinnæ being very long and tripinnate or thrice divided, which is the case with the upper ones but on less and less marked lines as they approach the frond tip. This fern forms no cup-like caudex like the Male Fern, the fronds rise irregularly, with bright green, brown-scaled stalks which unroll ball fashion, not forming hooks, the brown scales being thus very evident, though eventually falling off to a large extent. The fronds, when the plants are full grown and well-developed, may be three or four feet long and spread out in a very handsome fashion, but on smaller plants in exposed situations they are more erect. The species is subject to a good deal of minor variation, and it is due to this that the older botanists thought fit to name as separate species the ferns known as *L. uliginosa*, *L. spinulosa*, and *L. cristata*. The last-named is not a crested form at all, and it is difficult to imagine why such a name was given. It is an erect-growing narrow form with a long bare stalk and rather short side-divisions, set on at some distance from each other, the frond having a narrow lanceolate outline. This is, therefore very distinct from the typical *L. dilatata*, but is regarded as the extreme type of a range of intermediate forms embracing *L. uliginosa* and *L. spinulosa* among the gradations, rather than a distinct species.

L. EMULA.

The Hay-scented Fern.

This may be described as roughly resembling a smaller form of *L. dilatata*, the fronds being of very similar make indeed. It is, however, distinguished by its subdivisions being crispy and its caudex more caespitose or bunchy, consisting of a mass of embryo fronds far more numerous than those which are evident in the other allied species. It affects moors, hillsides, woods and hedges, and in favourable positions may produce fronds a foot and a half long in pretty clumps. It usually crops up locally in more or less

isolated colonies, and in but few places prevails in any quantity. The hay scent is more perceptible in dead fronds than green ones, it is very persistent, and is not dissimilar to the perfume of the Tonquin Bean.

L. THELYPTERIS.

The Marsh Buckler Fern.

This differs markedly from the other members of the same genus in having a creeping rhizome or rootstock, like *Pteris aquilina* or the *Polypodies*, whence the fronds spring singly in succession. It is found locally but always in boggy ground, its stolons permeating actual mud. The fronds commence with very long bare stalks and are tall and slender, the pinnæ commence high up, and the fronds resemble in their upper part drawn-up fronds of *L. montana*, i.e. of narrower lance-like outline, and the pinnæ more distant. It is quite deciduous, and its creeping roots form dense mat-like masses.

L. RIGIDA.

This species is only found on limestone formations, it resembles a somewhat stunted Male Fern with somewhat wider fronds, which are of a dull green. Its general habit is the same, but its peculiar glandular surface makes it easily distinguishable. Deciduous.

C. T. D.

SOME POLYSTICHUMS; SPECIES AND
VARIETIES—*continued.*

The *congestum* forms are more or less dense, dwarf, imbricate; and although there is a good deal of foliaceous matter it is necessarily compressed into a comparatively small compass. Hence we have such little gems as C. Lyell, Padley, and Wills. *Cristatum* and *grandiceps* may well be taken together, as the latter is a magnification of the former. Under both these designations there are many fine varieties,

in fact, a well-grown *cristatum* may run a *grandiceps* very close. On the other hand some crested forms are so slender, graceful and neat that all the creasing is extremely small. Such a plant is Moly's *cristato-gracile*, really a *percristatum*. This variety comes true from spores. In *grandiceps* we have "swollen heads," especially in Barraud's form, which is nearly all head. Moly's, too, is a bold and splendid instance of a magnified crest. In the *decompositum* the pinnules are sub-divided, therefore there is a plumose look about them. All are handsome, in fact, Pearson's form has given a fine *plumosum*; while *splendens* Moly is reputed to be the parent of *densum*, *laxum*, *robustum*, Jones and Fox, of which more anon.

As we are now within measurable distance of the *plumosums* we will accept the significance and proceed to note a few. The beauty of this group is beyond cavil, and that beauty is undoubtedly due to the increased development of their foliaceous parts. But strange to say this super-growth affects their fructification, which in consequence is scanty or absent. Exception, however, must be made in the case of Wollaston's yellow green variety, which not only spores freely but gives typical progeny. Moreover, it is as free as it is fine. One morning I was much impressed with a large plant in my Fernery, for it happened to stand just where the sunbeams came through and suffused the Fern with gold! Hence my partiality. Patey's form is exceedingly beautiful, and so is Elworthy's. All fronds come symmetrical and true, which cannot always be said of the *plumoso-divisolobum* varieties. *Plumosum grande*, *p. perfectum*, and *p. splendens* are equal to their respective designations. But what shall we say of Birkenhead's *plumosissimum*? Has it ever been seen since so finely developed as in the illustration in "The Book of British Ferns?"

Dr. Stansfield very kindly sent me a small plant four years ago, which was carefully potted up and ultimately resulted in a *respectable* specimen, but it failed to produce those wonderful, attenuated, thread-like growths in quan-

tity, such as give this variety its peculiar charm. I am now trying this *out of doors*, where, after the heat and drought and stress of the past season it is now (October) sending up its seductive fronds. We now come naturally to the *plumoso-divisolobums*—they seem to follow as a matter of course, but they do not always respond to our benevolent attentions. In the early summer they affect a promise which they do not always fulfil. Perhaps that is because we do not understand them. Anyhow they are beloved of all the cult; and if they have *shortcomings* we look at them only to overlook them. At their best they know no rival in our native species—in delicacy of cutting, dense imbrication, and piled-up moss-like development. One could not conceive their beauty—they must be known and grown to receive their fullest appreciation. It is only necessary to mention *Grimmondii* and *Esplan*, or *dissectum* and *foliosum*, for they are all synonymous with vegetative beauty in the highest degree.

Grimmondii, however, is one of those splendid forms which under glass rarely complete their tips, and therefore give the cultivator some little cause for thought. *Densum Esplan*, on the other hand, is probably too dense to always bring about this very desirable achievement. Still it is sometimes wayward in this respect, for recently I saw a very good instance at Acton, in the fernery of Mr. J. H. Wright. The plant also possessed a good colour and was very well proportioned. Mr. Wright thinks it is all a question of moisture, for pot and saucer were intimately associated. The habit of this plant, too, is quite distinct, and Mr. Druery's description of "star-fish-like" fits it well. Possibly the highest phase of development has been reached in the superb varieties of Jones and Fox. Here we have *Baldwinii*, *densum*, *imbricatum*, *laxum* and *robustum*, but the greatest of these is *Baldwinii*. Moreover these are occasionally sparsely fertile, and Mr. Druery is the fortunate possessor of *one* which resulted from a batch of seedlings raised from the original *Baldwinii*, from the collection of the

late Mr. Lowe. This plant perfects its tips under circumstances where the rest of the batch fail. This unique specimen is growing in a square 9-inch pan only $2\frac{1}{2}$ inches deep, where it has been for several years! It also promises well for another season, for it has a good fat crown and six full-sized fronds about 26 by 8 inches across. In the matter of culture Mr. Druery evidently believes in letting well alone, for had the plant been mine it would at least have been installed in a 10-inch *pot*.

Having rambled on so much and so far, and having come to the climax in development there remains little more to be said—except, perhaps, by the Editor—although I am loth to leave this subject without referring to the *pulcherrimum* section. All are *beautiful* when in good condition, while one is unique, viz. Moly's *p. variegatum*. As a rule variegated Ferns are not an acquisition—they savour of disease; but this one is distinctly and regularly marked with a golden tint, and is moreover constant and *recherché* in character. It is also aposporous, but Mr. Druery informs me that the progeny are almost invariably depauperate and inconstant. One more variety and I have done; in fact, I can almost hear some members say “overdone.” [Ed. No!] Mr. Phillips will not say so, for it is to his *setosocuneatum* that I wish to refer. Several years ago he sent me a plant, and the sight of this invariably reminds me of what he has done in the field, or rather mountain and glen. And this one in particular is one of the best of his many beautiful finds, for it is lax in habit, silky in texture and refined in appearance. My compliments to him through the “Gazette.”

If I may still further prolong this article, I would like to offer a few notes on

CULTIVATION.

As all the ordinary varieties of *polystichums* are hardy, robust, and easily managed, there is no particular reason for detailing their cultivation in the garden or frame.

They are so free-growing and so full of vigour that almost any soil or situation—minus a southern one—will agree with them. They bear exposure well when planted in a deep rich soil, but it is always desirable to bear in mind their origin and history. They are shade and moisture-loving plants; hence it is wise to observe these facts. There is, therefore, no reason why the finer varieties should not adorn the garden—always assuming that the garden is not too urban. At Kew they consider that soil that will grow cabbages will grow Ferns. Perhaps this is so—with certain reservations. I am inclined to limit this to *Polystichums*. Anyhow, these Ferns revel in a good deep rich loam. But for many of the better forms frame culture is more satisfactory. They are more under control, can be protected from wind and weather, and make better specimens. The compost, too, and the drainage can be better manipulated; and if the Ferns are planted out will give little more trouble than their *confrères* of the garden. Such an arrangement—rather a large one—is adopted by Mr. Wright aforesaid. He recommends this mode of culture and certainly the results are highly pleasing. It is, however, when we come to pot culture under glass that the soil question becomes more or less acute. Here the area is limited and the conditions artificial. For pots, then, I prefer a rather rough compost consisting of the best fibrous loam and leaf-soil I can obtain, to which must be added a sprinkling of charcoal, broken brick, or coarse sand to keep the moisture sweet and open. If leaf-soil cannot be obtained, then two parts loam and one of old hot-bed manure, with, of course, the other additions. Pot *firmly*—and less water will be required, a consideration in the growing season when this indispensable commodity is most in demand.

As to *when* potting should be performed I favour autumn, although in the hands of an expert it may be done at any time. But there is potting and repotting—much or little root disturbance. The *Polystichum* resents root disturbance.

Pull a crown to pieces in the spring and you will have to wait and watch a long time before growth recommences. Perform this operation in September or October and you will gain a season. Little water will be required during winter, but when the dog-days arrive, and the pots are full of roots, saucers should be brought out to help to keep the plants moist and cool. That I believe is a desideratum for, say, the *plumoso-divisolobums*. But, enough; although I have not said half as much as I could have commanded. *Polystichums* are fascinating plants, and I do not wonder that those who have been "badly bitten" require a Pasteur to relieve them.

In conclusion, I would urge that the Fernery should be kept for Ferns. Eschew flowering plants. Let the Ferns be the flowers: but if Mrs. Fern-lover will also have *Phanerogams*, build her another structure, so that you may pursue your pteridological studies with unalloyed content.

C. B. GREEN.

NEW FERN STRAINS.

When we study the history of Fern evolution, so far as this relates to the development of varietal forms of a particularly marked character from comparatively inferior varieties found wild, we must speedily appreciate that three particular examples stand out more conspicuously from the rest. The three wild varieties concerned are *Athyrium filix fœmina plumosum Axminsterense*, found by Mr. J. Trott, in 1860, near Axminster; *Polystichum angulare decompositum splendens*, found by Mr. Moly, 1875, in South Devon; and *P. aculeatum pulcherrimum*, found in 1876 in a hedge in Dorset by a farm labourer named Beavis, and given to Dr. Wills, who resided close to the locality of the find. It is only by comparison with their really wonderful offspring that we have termed these "inferior" varieties, since their departure from the normal type was marked enough, the *Athyrium* being a fine

decompositum plumose form, though, happily, by no means barren of spores, the *P. angulare* a triply-divided one instead of being merely specifically bi-pinnate, while the *P. aculeatum* was in itself an unique variety of great beauty and a peculiar slenderness and delicacy of make, particularly at the frond tips, which no other native fern has exhibited. It was Moly's *decompositum* which was the first to demonstrate the faculty of yielding offspring through its spores, so widely different from itself that the fortunate raisers—Colonel A. M. Jones, of Clifton, and Dr. Fox, of Brislington—could not credit the real parentage until a second sowing confirmed it by yielding similar results. From the spores on an only partially tri-pinnate or thrice-divided frond there arose a batch of the most feathery and mossy-looking ferns conceivable, quadri- or quinque-pinnate, and with all the main subdivisions so expanded and dissected that, instead of lying in a single plane, they overlapped and piled themselves one upon another to form veritable heaps of delicate verdure. Since the appearance of this strain a number of beautifully plumose forms have made their appearance on similar lines, such as Pearson's, Esplan's and Grimmondii; but the parentage of all these is so vague that the opinion would appear to be justified that spores of the Jones and Fox section, since spores are sparingly produced, may have yielded them. Pearsonii, at any rate, originated in Messrs. Pearson's Nursery at Chilwell, whither many of Mr. E. J. Lowe's plants were sent, and we have ascertained from Mr. Charles Pearson that the decomposite parent of "Pearsonii" was one of these, and unrecorded as a wild find. It is, therefore, reasonable to assume from the nature of its offspring and their similarity to the Jones and Fox strain that it was probably one of the original non-plumose seedlings from Moly's plant. All this, however, can be but conjectured; but, in any case, the fact remains that no divisolobe plumose variety has yet been found wild. All are secondary "sports" under cultivation. "Bald-

winii," which is by far the finest cut and most delicate of the Jones and Fox section, is reported by Mr. Lowe to have arisen from a bulbil of "densum," a point which is to some extent confirmed by the fact that the writer, who was fortunate enough to find a few spores on Baldwinii which were sown with Mr. Lowe's sanction, raised thirteen plants, all of which, save one, were counterparts of "densum," though in some cases rather more finely divided and apparently of better constitution. The exception, curiously enough, cannot be distinguished from the wild find known as *plumosum Pateyii*, which has flat papery, foliose fronds of the wild "plumosum" type.

We may now turn to the "superbum" strain of Lady Ferns of "Axminsterense" origin, which in some respects stands alone as regards diversity of type. The wild Axminster *plumosum* was propagated for many years through its spores, which produced the parental plumose form. Then a more dissected form appeared, which was named *plumosum elegans Parsons*. No trace of crested appeared in either of these, nor, so far as we know, in any of their progeny. *Axminsterense*, like others of the plumose Lady Ferns, bears bulbils associated with the sporeheaps, and the writer having found such on *A. f. f. pl. divaricatum*—a quite separate wild find—a pinna of "elegans" was sent to him by Mr. Fitt to show that it, too, did the same. Attracted by the beauty of the pinna, the writer sowed some spores, with the extraordinary result that only two of the offspring were "elegans," while all the rest—about 100—were well crested as well as plumose. All but two of these, however, showed defects—missing or shortened pinnæ and pinnules—and were consequently rejected. Of the two in question one was much finer than the other, being heavily and symmetrically tasselled at all terminals. This was at once named "superbum." This soon bore a few spores, which were immediately sown, with the astounding result that the numerous offspring broke into two distinct sections—crested and uncrested—all far and

away excelling in beauty and fine dissection the grand-parental and parental forms. Among the non-crested forms *A. f.f. plumosum* Druery speedily asserted itself as incomparably the finest Lady Fern known, its great size and fine cutting rendering it unique. At the head of the crested section *A. f.f. superbum percristatum* bore fronds distinctly crested to the fourth degree, even the pinnules being beautifully fanned at the tips, while frond tips, pinnæ and pinnules bore well-developed tassels of great beauty. A considerable number of plants of both sections arose from the sowing of the "superbum" spores, and all without exception were extremely refined in character, some of the uncrested type, such as "dissectum" and "plumosissimum," constituting reversions to the original "Axminsterense" form, but more finely cut than even "elegans." Some of both sections have developed the bulbil-bearing character, and, curiously enough, "*plumosum* Drueryi," despite its extremely foliose and plumose character, has had in some seasons its frond backs covered with bulbils with developed young fronds. These bulbils yield quite true replicas of the immediate parent, but only on a few occasions have they succeeded in surviving the winter, since, of course, they are terribly handicapped by the fact that the fronds bearing them are quite deciduous, dying down in the autumn, and thus depriving them of support. Success has only been achieved by layering portions of the frond early in the autumn, and inducing, by close culture, the formation of sufficient roots to tide them over the dead season.

The history of the third case—that of *Polystichum aculeatum pulcherrimum*—which has yielded us the entirely new "gracillimum" type, is of peculiar interest. In 1876 Dr. Wills, of Chard, one of our most noted fern-hunting pioneers, had a fern brought to him by a farm labourer named Beavis, who had found it in a hedge bordering a field in which he was working and thought it curious enough to engage the doctor's attention. Dr. Wills had

explored the locality for years, and found a large number of very fine varieties ; but, on examining this one, he was compelled to own that it quite surpassed anything he had himself discovered, owing to its singularly graceful form, great size, and the peculiarly pretty arrangement of the terminal pinnæ of every frond, these being curved inwards towards the tip, so as to overlap each other, the tip itself being long and attenuated. Despite its robust character it was quite barren, but under cultivation it displayed a strong tendency to produce lateral offsets, and by means of these the doctor was enabled to distribute plants freely among his fern-loving friends. One went to Mr. G. B. Wollaston, and in time he gave the writer an offset, which flourished, reached full size, and provided others. One of these was given to Mr. C. B. Green, of Acton, a neighbour of the writer, and under his fostering care, in a few years, a very fine plant resulted. Dr. Stansfield, visiting the writer's collection, was taken round to see Mr. Green's, and under our joint close inspection with a lens, dictated by experience of the sometimes minute character of the fructification on very plumose *Polystichums*, to our great delight here and there on a few of the pinnules single sporangia were detected as tiny black dots.

CHAS. T. DRUERY, V.M.H., F.L.S.

(To be continued.)

SPRING TREATMENT OF HARDY FERNS.

Since by the time this number reaches our members the best period will have arrived for re-arrangement, repotting, planting or dividing the hardy ferns in their collections, a few words on that subject will be appropriate. It is in March that active growth really commences ; although there is not much obvious evidence of it, the roots will be found to be pushing their whitish points into the soil, the crowns are appreciably swelling and from the bases of the future fronds new fresh roots can be discerned pushing their way down the sides of the old caudices in order

to reach the soil and do their part towards the formation of the coming season's crown. The fronds of the previous season will, in the deciduous species, be absolutely brown and withered, but still serve some purpose as a protection of the crown from dry winds and frost. Those of the evergreens, though more or less battered if grown in the open by winter storm and stress, will retain much of their verdure and not only afford greater protection than the absolutely dead ones, but undoubtedly contribute by chlorophyllic action to the formation of the coming frond system. Hence, in neither case is it advisable to be too drastic in clearing away the debris, and if for the sake of tidiness the perished fronds are removed, the protection indicated above should be maintained by liberal mulchings of old leaves around the crowns. Otherwise those new roots which always spring from the basis of the new fronds may get nipped by cold drying March winds, and the first set be thereby crippled.

The absence of any young and delicate growths at this period, the coming frond crop being still snugly packed within the crowns, naturally permits of freer handling than at any other time, while the energy induced by the long winter rest enables the plants to bear, with practically no check at all, the stress of transplanting and dividing operations, which in the growing season can hardly be effected to such advantage. Ferns of the crown-forming type such as *Lastreas*, *Athyriums*, *Polystichums*, whose fronds arise on more or less shuttlecock lines round a central axis of growth, invariably display their finest character if they can be grown as single crowns, instead of as clumps, which most of them have a tendency to form by means of lateral offsets. With single crowns, we obtain all-round symmetrical plants, of which each frond can display its charms without interference with others. We also encourage growth by preventing root competition in the soil, which must follow where numerous crowns closely compacted are allowed to form. The result is that not

only are the fronds larger, but the particular varietal character is greatly enhanced. A secondary advantage of course is that specimens can be multiplied, since with judicious separation all such lateral offsets when removed will be found to have their own root system and thus only require replanting to form full-sized specimens in time. The best plan is to lift the plant bodily with a strong fork and force the various crowns gently apart with a blunt trowel, or, as is often the case with Lady Ferns, which multiply rather by fission or splitting up of the crowns on Siamese twin lines, a sharp knife may be employed to cut down into the connecting portion or neck until the two sections can be forced asunder with the fingers. When this is done care should be taken not to squeeze the upper part of the crown in which the coming fronds are packed, as this may do damage to eventual development. The Shield Ferns have a greater tendency to retain the single crown formation, but in many cases produce not only lateral bulbils, but also others near the bases of the fronds on the frond stalks. In the "proliferum" or acutilobe section of *P. angulare*, innumerable bulbils are sometimes produced all the way up the frond, whence the name of proliferum. Nothing is easier than to propagate such forms by simply layering the fronds in their entirety, or so far as they shew the proliferum character, or they may be cut into short sections and pegged down in special pans, or inserted in the edges of pots containing other plants.

Ferns with creeping rootstocks, such as the Polypodies, do not, of course, lend themselves to single crown culture and are best left alone if doing well, though, as Nature teaches us, a mulching of old leaves is beneficial, that constituting Nature's own manuring. If clumps of *P. vulgare* varieties are out of condition, they may be divided into sections consisting of a few inches of rootstock with roots, a few fronds and growing tips. These planted superficially on a compost of mainly leaf mould, oak for preference, only the fibrous roots being buried and the

fleshy ones pegged down on the surface, will soon take hold and make good plants.

Under glass, with pot culture, the same remarks apply. Pots and staging should be clean, and if, as is only too frequently the case, watering has been neglected, a thorough soaking for an hour or two is necessary to give the droughted specimens a chance of recovery.

Those who are troubled with that worst of pests, the Weevil, should narrowly examine the ferns, especially Hartstongues, and if any show signs of wilted or loose fronds they must be turned out, and the probable brood of fat white grubs destroyed. It may even be necessary to wash the soil entirely away and pull the plant to pieces, since the grubs burrow into the very caudex itself, and unless extracted will inevitably complete its destruction, and not only that, but equally inevitably develop into a brood of frond-devouring beetles in the coming season.

Baby plants resulting from last season's spore sowings may now with advantage be pricked out into pans an inch or two apart, or, if already in thumbs, transferred to larger pots. Naturally, for the reasons given above, the present time is the best for acquiring fresh varieties, since packing and transport can be effected with impunity and without damage. The installation of new rockeries or beds cannot also be effected under more favourable conditions, since we have the whole of the growing season in front of us, and the mild spring conditions of showery cool weather are the ideal ones for giving a fair start without any handicap whatever. If spores have been gathered and stored from last season, they too may be sown now, as the next best time to that immediately following their ripening in late June or July.

THE ANGULARE PULCHERRIMUMS.

These beautiful and interesting forms are but little known to the collector and cultivator of the present day, as they are rarely to be found in collections, and have not

been figured in any book or publication, with the exception of the nature-prints by Col. Jones of Mrs. Thompson's and one of Mr. Moly's forms, the former of which has been reproduced in our Editor's latest book of ferns. Having been reduced by photography, however, that figure gives but a feeble impression of the great beauty of the frond from which the print was taken, and which is well shown in the original nature-prints. The notes by Col. Jones on p. 394 of the same work constitute practically all that has been published upon the subject. As the type is now so rare, it is a little startling to discover that no less than sixteen separate wild finds of this variety have been made at various times, though, I believe, none has occurred during the last quarter of a century. The late Rev. C. Padley and the late Mr. C. Jackson were the earliest discoverers, but Mr. Moly was by far the most successful, he having found no less than six of the intermittent and three of the constant or permanent type.

The leading characteristics of a *pulcherrimum* are the excessive development and fine cutting of the lower pinnules, the peculiar foliose character which this gives to each pinnule and pinna, and the extremely graceful and feathery appearance of the whole frond. In addition to the above, there is generally, if not invariably, the biological characteristic of apospory to be observed. The thread-like tips of the pinnules and pinnulets grow out, under moist conditions, into prothalli expansions which if layered will grow and produce plants. The generally abortive sori also are capable of giving rise to prothallic growths when the fronds are layered. It is not too much to say that in this variety the species rises to its highest flight of genius, at all events so far as wild varieties are concerned. Mr. Moly, writing to me in 1886, called them "the desired of all collectors," and continued, "I have found some which, if you could see them, would make your hair stand up 'like quills upon the fretful porcupine'; but, alas! although tended with the most loving care, they refused to stay in this world." This

obstinate tendency to seek the Elysian fields or else to revert to the normal has made this section the despair of most cultivators. Of the sixteen forms found wild, only five were of permanent or constant character, the rest producing a varying proportion of *pulcherrimum* fronds among a number of normal ones. Of Mrs. Thompson's form, which was one of the most beautiful when in character, Colonel Jones said: "You only get a really good frond about once in ten years; in average seasons two or three pinnæ in character are as much as can be expected." This kind of behaviour might be reasonably expected to damp the ardour of the most devoted admirer, but the fact remains that it did not do so, as I think all those who ever had plants of any *pulcherrimum* kept them as long as any hope remained of good, or even decent, behaviour. I have myself a plant which was once Mrs. Thompson's *pulcherrimum*, but which has remained consistently a normal *angulare* for more than twenty years. Mr. Wollaston, I believe, kept, to the time of his death, a renegade plant of Padley's find as "a monument of fallen greatness." Mr. Wollaston, mighty hunter though he was, never found a *pulcherrimum*, although I believe it was his greatest ambition to do so. Mr. Wills found two inconstant forms and one, a great beauty, which in some hands remained constant for many years, but there was always the danger that individual plants would drop their character like a mask and go on as normal *angulare*. Having once fallen, they never, I believe, repented or achieved reform. While in character Wills's was always a rather difficult plant to please. It would appear robust and luxuriant for one season, and the next would sulk in spite of the most persuasive coaxing, and would not unfrequently die in these fits of depression. The appearance of a normal frond was always the signal for a return to physical health, and also almost invariably the prelude to complete moral degradation. I struggled with its moods and caprices for many years, but for the last ten I think it has been perfectly healthy, but quite normal. Whether it still exists in other

hands as a *pulcherrimum*, is, I fear, more than doubtful. Of the whole sixteen wild finds two only are now known to remain in character, both being finds of Mr. Moly. Both are exceedingly beautiful forms, though perhaps neither of them is equal to some of the lost ones.

P. ang. pulcherrimum variegatum Moly is perfectly constant as regards the *pulcherrimum* character, never having thrown a normal frond, and is also consistently and most beautifully variegated. The variegation is quite regularly disposed and is developed in a curious manner. The young frond while unfolding is of the normal green colour, but as soon as it is fully developed the upper pinnules turn to a pale yellow which gradually deepens as the season advances until, in the autumn, it becomes in favourable seasons a rich orange. The lower pinnules, however, remain throughout the season of a vivid green, which shows up in strong contrast to the rest of the frond. The green also permeates the yellow to some extent in veins, which produce a beautiful effect of pencilling. The colour scheme, in a pure atmosphere, is certainly the most striking and distinct which is known among British ferns. As a young plant this fern is perfectly symmetrical, and has every characteristic of high breeding and perfection of form. As if to show, however, how "great wits to madness are allied," no sooner does it attain to adult size than it begins to show a lamentably ugly depauperate character in the upper half of the frond. The lower half remains quite perfect and beautiful, but the extremity goes "all to rags," completely spoiling the symmetry and grace of the plant. For many years it has been my ambition to breed out this fault if possible. There were many difficulties in the way. First, the miffiness of constitution of the plant caused by the lack of chlorophyll in its fronds. Unless it be treated with the tenderest sympathy it will refuse to grow, and will incontinently die if neglected in any way. It produces as a rule no spores, although there are plenty of abortive sori,

and it is only occasionally that it can be propagated by apospory. I have raised several batches, consisting of hundreds of plants, in this way, but the offspring are almost invariably rags and tatters of the most disgraceful kind, fit only for the rubbish heap. There has been, however, one exception to this rule—a plant which is not only symmetrical when young, like the parent, but which remains almost perfectly symmetrical when fully developed. I say *almost*, because even this plant shows traces of the parental vice by an occasional abortive pinna or pinnule. The majority of the fronds are, however, quite perfect, only one in half a dozen or more showing a defective pinnule or so. In this respect it is a great advance upon the parent.

Another (probable) exception is a plant, from the same batch of *prothalli*, which is neither a rogue nor a *pulcherrimum* nor a *variegatum*, but a strong green *divisilobe*. Inasmuch as this is the only one of the offspring which shows no variegation (even the worst of the rogues showing some trace of that character), it is arguable that it probably originated from a stray spore—was, in fact, a cuckoo in the nest—and not from the *pulcherrimum* at all. While it is impossible to prove that this was not the case, the fact that this plant shows traces, when mature, of the parental depauperation in an occasional abortive pinna towards the tip of the frond, is fairly strong evidence of its legitimate descent from the *pulcherrimum*, especially as no other *divisilobum* is known to have a similar tendency to depauperation.*

The remaining (wild find) *pulcherrimum* is Moly's green

* With regard to this plant we hardly share the doubts of its origin suggested by Dr. Stansfield's notes. Some years back he showed us a robust plant of it, and asked us if we could form an idea of its origin, without, however, giving us the slightest clue. Examining it closely, we immediately asked if it had not the blood of Moly's *pulcherrimum variegatum* in it, so strongly did the make of its sub-divisions suggest full parentage. His reply indicated little or no doubt of such origin, and as we still possess a strong plant, from a division which he kindly supplied on that occasion, our opinion, after a fresh examination, is decidedly in favour of its being a "sport" from that beautiful fern.

form. It belongs to the intermittent type, because, although the majority of the fronds are true *pulcherrimum* in character, there are generally a small proportion of normal ones produced as well as a few of a mixed character. This year, for the first time in twenty-five years, the fronds have been *all* true *pulcherrimum*. This plant shares with the variegated one, and with, I believe, all other *pulcherrimums* which have been tested, the character of apospory, and offspring can be raised from it without much difficulty. The progeny in this as in other cases (with the exceptions I have named) are, however, depauperate or at best normal, and show no trace of *pulcherrimum* character. Apparently there is something in the *pulcherrimum* type in *angulare*, which presents its transmission to offspring. The fact, however, that there has been no exception may well stimulate endeavour not only for the propagation of existing forms, but for the production of new and improved ones. Another possibility, which has not yet been fully tested, remains in the fact that the degenerate offspring not infrequently bear perfect spores which may give rise to *atavistic* offspring, *i.e.* to ferns which may hark back to the grand-parental *pulcherrimum* character. This experiment has already been made without success, but only upon a small and indecisive scale.

In addition to the wild forms several *pulcherrimums* have been raised under cultivation. One or two of these have already gone the way of the wild finds, *i.e.* they have either dropped the *pulcherrimum* character or died. The first one, I believe, was raised by myself from mixed spores sent to me by Colonel Jones, and this is still in existence. Fortunately, or otherwise, the *pulcherrimum* blood is crossed with the *polydactylum* strain and the result is rather curious. The spring fronds are of true *pulcherrimum* type with *polydactylous* tips, and are of very thin and fragile consistence; the autumnal ones regularly drop the *pulcherrimum* character to a great extent, and become merely *polydactylous* or *polydactylous-plumose*. These latter are of much stouter

texture and serve to build up a new crown for the following year. Had it not been for this *polydactylum* admixture I strongly suspect that the plant would ere this have perished from inanition. The comparatively coarse *polydactylum* type gives a robustness to the constitution, which is lacking in the high-bred *pulcherrimum* form. More recently a very promising seedling of *pulcherrimum* type has been raised by my brother, Mr. H. Stansfield. A very young frond of this was figured last year in the "Gazette." This year (1911) it has developed the *pulcherrimum* character in a more pronounced form and still continue to promise well. Until it reaches the adult state, however, it cannot be assumed that the character will be permanent. These things are upon the knees of the gods.

Fern-hunters, wake up! It is more than twenty years since a *pulcherrimum* was found wild. The womb of Nature is inexhaustible, and the seventeenth find may surpass any of its predecessors.

F. W. STANSFIELD.

READING, November 13th, 1911.

NEW FERNS.

Miss Hawkins, of Kingston-in-Fields, near Derby, has sent me a frond of a very fine *Crispum Scolopendrium* found this year by her brother Mr. Richard Hawkins, near Middleton, co. Cork. It is very near to *crispum grande*, Wills,' from which it differs in being slightly less deeply undulate, and in having prominent veins on the upper surface, which give an appearance of "tooling," such as is seen in *S. crispum diversifrons*, Jones. The discoverer, who is a brother of our member, the Rev. E. H. Hawkins, is to be congratulated upon a first-rate find. I suggest the name *S. v. crispum grande*, Hawkins.

F. W. STANSFIELD.

"BRITISH FERNS AND THEIR VARIETIES,"

By Charles T. Druery, V.M.H., F.L.S.,

With forty magnificent coloured plates, 319 wood cuts and other illustrations, and 96 monochrome reprints of a selection of the choicest varieties nature printed by the late Col. A. M. Jones of Clifton, with his original notes *in extenso*. In cloth 7s. 6d. net; in half morocco, gilt, 10s. 6d. net.

It will interest the members to know that by the enterprise of Messrs. George Routledge & Sons, Ltd., the author has been enabled to realize one of the pet ambitions of his life, viz. the production, on practically untrammelled lines, of a thoroughly up-to-date and well illustrated record of our native ferns in their specific and varietal forms, together with such information as to their history, culture and biological peculiarities as will render the work a thorough compendium of knowledge for the amateur's reference plus indications of sources of knowledge valuable to those who take an interest on the scientific side. The addition of an appendix consisting of ninety-six of the choicest of the late Col. Jones' nature prints, accompanied by his contemporary notes, which the author has been kindly permitted by Miss Jones to use as a supplement, renders this book an absolutely unique one, apart from its comprehensive and practical character in other directions. Certainly no British Fern lover or Botanical Library should be without it as *the* standard work on the subject, and it would be an advantage to the author (the Editor of the Gazette and secretary of the British Pteridological Society) if orders for it were sent to him personally to his address as given elsewhere.

FERNS.



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... The ...
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Gazette.**

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CHARLES T. DRUERY, V.M.H., F.L.S.

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KENDAL, WESTMORELAND.



THE LASTREAS (NEPHRODIUMS).

THE BRITISH FERN GAZETTE.

VOL. I.

JUNE, 1912.

NO. 12.

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EDITORIAL NOTES.

It is with much pleasure that the Editor is enabled in this number to complete the first volume consisting of twelve consecutive issues covering three years of the existence of the "British Fern Gazette," a record in this country of a serial publication dealing exclusively with our beautiful British Ferns. From the many appreciative letters which he has received during that period, he cannot help feeling that it has been all the success which he could have desired, and he seizes this opportunity to express his cordial thanks to those members who have aided him to fill its pages with really interesting and practical information. Thanks mainly to the establishment of the Gazette, the original membership when it started of little more than a score has been increased more than sevenfold, with the result that instead of the Society's funds being depleted by the expenses incurred, they have actually been increased. The Editor, however, despite all this, is not yet satisfied. Too few of the members contribute to the pages of the Gazette, and it is his ambition

also to increase its attractiveness by more matter and more illustrations, to which end more members are required to cover the additional outlay. Several of the members have assisted him greatly by enlisting fresh subscribers among their friends, and he earnestly asks the rest of them to do the like whenever opportunity presents itself. A free copy will be sent on receipt of the name and address, and the small subscription of 5s. per annum, entitling to four Gazettes and membership, *i.e.* association for mutual benefit with fellow fern lovers, is surely little enough.

THE AUGUST MEETING.

Due notice of this meeting, which will be held this year at Arnside, will be issued beforehand, and it is hoped that the central position of the rendezvous will enable a large number of the members and also friends to be present. Thanks to our member, Mr. T. G. H. Eley, we are enabled to accompany this Gazette by an interesting little guide to Arnside and its locality, which is sufficiently within the ferny domain of Lakeland to justify the hope of some good "finds" during the excursions which it is intended to make prior to the meeting, in connection with which excursions a contribution to the expense *ex* the Society's funds was voted at the last annual meeting at Barnstaple.

As forming the completing number of Vol. I. of the Gazette, we have included a title page and also a table of the contents of the twelve numbers concerned, plus a list of the members up-to-date, so as to enable them to be bound up into what we think will be considered by every fern lover as a very interesting and acceptable volume.

We have a sad note to conclude with, as our members will learn with extreme regret that our President, Mr. Alexander Cowan, has recently suffered the sad loss of his wife, and we are sure that one and all will accord him their heartfelt sympathy in his bereavement.

THE EDITOR.

OUR FRONTISPIECE.

THE LASTREAS (NEPHRODIUMS).

It will be seen by our frontispiece that the genus to which our common Male Fern (*Lastrea filix mas*) belongs has proved itself very capable of rivalling even the versatile and multiform species of the *Polystichums*, and Lady Ferns by the production of beautiful and symmetrical "sports."

The varieties depicted, in the order of their species, are as follows :—

- Fig. 1. *Lastrea dilatata grandiceps* Barnes.
 „ 10. „ „ *cristata gracilis* (top of frond).
 „ 15. „ „ *folioso-cristata* (top half of frond).
 „ 2. „ *-pseudo mas ramosissima*.
 „ 4. „ „ *ramulosissima*.
 „ 5. „ „ *cristata* (pinna).
 „ 7. „ „ *crispa cristata*.
 „ 8. „ „ *revolvens* (centre of frond).
 „ 14. „ „ *ramo cristata* Fitt.
 „ 16. „ „ *crispa cristata angustata*.
 „ *3. „ *filix mas grandiceps* Berry.
 „ 6. „ „ „ *Bollandæ* (pinna).
 „ 11. „ *filix mas polydactyla* Dadds (top of frond and pinna).
 „ 13. „ *propinqua cristata* (top of frond).
 „ 9. „ *æmula (recurva) cristata*.
 „ 12. „ *montana cristata* Barnes (top half of frond).

For further details of the *Lastreas* generally, we refer to our article, page 258-62, in our last issue, and elsewhere as per "Contents."

* This very fine form turned out to be inconstant, and we doubt very much if it still exists; we have, however, inserted it to show capabilities. It was found in North Devon.

OUR COMMON FERNS.

THE SPLEENWORTS.

In continuation of my notes on our common or normal Ferns, as representing the raw material from which Nature has fashioned so many beautiful "sports" or varieties, whence by the selective cultivator's aid a large number of improved forms have been raised, I will now deal with the Spleenwort or *Asplenium* family.

The generic character of all the Spleenworts is that the spore heaps are long and arranged herring bone fashion on each side of the midribs, with a thin skin-like cover over the immature spores, springing from the lower side, this is eventually hidden when the spores are ripe.

Probably the most widespread of all is

THE MAIDENHAIR SPLEENWORT (*ASPLENIUM TRICHOMANES*).

This is a small growing species confined practically to rocks, old walls, or hedge banks of a roughly constructed stony character. It is never found in flat open soil such as is favourable to the growth of larger species. It is only at home in chinks and crevices, and in many parts of the country colonies occupy old walls, which are covered with hundreds of the pretty growths, whose roots are firmly anchored in the old mortar, often exposed to sun and wind. Under such conditions the fronds will not exceed a few inches in length, but when growing under more sheltered ones, say in a loose stone dyke with freer root room and a little shaded, we have found specimens with fronds three or four times as long. The plant grows in small clumps of accumulated crownlets whence the fronds rise so as to form a loose rosette or spreading bunch. Each frond consists of a black hair-like stalk, whence the common and botanical names, on each side of which is ranged a row of even and almost round or oval pinnae of darkish green, attached by a minute stalklet. The frond is narrow and of even width until near the top when it tapers gradually to a point. From the nature of its habitat it is of course often exposed to drought, which if excessive causes the fronds

to curl up and appear shrivelled, but it has marvellous powers of recovery, and given a good soaking rain speedily recovers and is none the worse. The only fern which can be mistaken for this is the

GREEN SPLEENWORT (*ASPLENIUM VIRIDE*).

The growth, size, and general appearance of this is very similar, but it is clearly distinguished by the frond stalks being of a bright green, as are the pinnæ, which are more firmly attached to the midrib. It is furthermore by no means so common, and although equally a true rock species, it affects moister situations and ascends to higher levels. We have found it in quantity near the top of Ben Lawers associated with the Holly Fern (*Polystichum lonchitis*), but also low down round the pits which form in weathered Limestone. It is a much more difficult fern to cultivate than *Asp. trichomanes*, though we have seen it doing fairly well in a London garden. The next and a far more common species is the

BLACK MAIDENHAIR SPLEENWORT (*ASPLENIUM*
ADIANTUM NIGRUM).

The common name is rather confusing in connection with the Maidenhair Spleenwort (*A. trichomanes*), but is a translation of the botanical one. Visually, however, it cannot possibly be confounded with it, being a much larger Fern and very differently made. It has a jet black polished stalk sometimes a foot or more long, frequents old walls in a more or less stunted state, and stone dykes with a background of soil in a more vigorous one. Its fronds are a dark lucent green, and it has large thrice-divided (tripinnate) side divisions, which commence some distance up a longish bare stalk, whose length is largely determined by the depth of the chink in which it grows, and by the other vegetation it has to push through. Roughly the fronds are triangularly shaped, about twice as long as the base is wide, and are very handsome in vigorous specimens. The

divisions are sometimes acutely pointed, and sometimes more bluntly, the difference appearing to depend largely upon climatal conditions, blunter in the north than in the south. Large quantities of fronds come from France for bouquet purposes, and these are all of the "acutum" type, of which, however, marked examples crop up now and again even when "obtusum" is the prevalent form here.

The next commonest Fern in many places is

ASPLENUM CETERACH (CETERACH OFFICINARUM) OR THE
SCALE FERN.

This is very distinct from the rest of the family except in its mode of bearing spores, which, however, is rather masked by the fact that the backs of the fronds are so densely covered with chaffy brown scales as to almost entirely hide the fructification. The fronds, too, are thick and leathery, of a dull dark green. They are only once divided into semi-oval blunt ended smooth-edged lobes, attached to the midrib close together by a broad base. The frond has a narrow lance-like outline with a very short stalk. It grows about six inches high in small clumps, and frequents old walls for preference. It is never found growing on the ground, or anywhere, except in thoroughly drained positions and even prefers the sunny side. It is so curiously resistant to drought that on one occasion we obtained some specimens of a crenate form in Asia Minor, which we placed in an envelope and then in a breast pocket and forgot all about them until months later when we found the dried and shrivelled plants in a discarded coat. We dropped the apparent debris into a pail of water overnight, and found the plant as "fresh as paint" the following morning. When planted they grew on as if nothing had happened. Curiously enough there is an exotic form of this (*C. aureum*) which only differs in its large size as it is nearly a foot high, and this we have been told grows in the soil under moist conditions.

THE SEA SPLEENWORT (*ASPLENIUM MARINUM*).

This Fern, as its name implies, is entirely a coast one, it is found in abundance on sea cliffs and in caves where access is difficult or in unfrequented localities. It lives well within the reach of spray and even of waves in stormy weather. It is one of the few Ferns which are not quite hardy, under culture a few degrees of frost kill it, but in a warm house it grows most luxuriantly quite independent of saline baths. In a vinery we have seen it form a bush two feet high and as much through, while seedlings of it were weed-like in their abundance. Normally its fronds are eight or nine inches long, very leathery, bright green and lucent, with once divided side divisions, set apart on the midrib to form a somewhat narrow frond of a lance-like outline, commencing with a moderate length of stalk. Its position practically indicates the species as only the true Maidenhair, *Adiantum capillus veneris* ever keeps it company, and that only on cliff faces and not in the caves.

ASPLENIUM LANCEOLATUM

is also a coastal Fern, rarely reaching very far inland. It is very much like *Asp. ad. nigrum*, but the side divisions are not stalked so obviously, and the frond is therefore compacter in make and somewhat thicker in substance, and the stalks are not so black. It is found in chinks in walls, and stone dykes near the sea. We found it once about two miles inland from Falmouth, growing in a hedge with *Asp. ad. nigrum*. It is by no means easy to grow in our experience, but after many failures we have succeeded by installing it in some soil wrapped round with living moss and rammed into a tumbler with a little water in the bottom into which a wisp or two of the moss dipped and drew up a supply as needed by capillary attraction. The plant was all but dead when installed as an experiment, but started a fresh lease at once and is doing well.

The rest of the family native to Great Britain are small

growing plants of no decorative value, and have done little in the varietal way. The prettiest is

ASPLENIUM FONTANUM,

which, however, has only been found in a few places, and not at all we believe of late years in a wild state. It grows erect about five or six inches high with prettily cut fronds, twice divided and rather narrow, a little in the line of *Asp. ad. nigrum*, but more compact. Owing to the arrangement of the spore heaps on very short lobes, they lose much of the lineal character, but the cover betrays the genus.

Asp. ruta. muraria, *Asp. septentrionale* and *Asp. germanicum*, may be bunched together as small growing rock and wall Ferns of no cultural value. The first is plentiful on old walls in many places, it has once-divided fronds with small often wedge-shaped sub-divisions, and forms tufts an inch or two high, though sometimes in shady positions as much again. The other two are so simple as to resemble stiff looking grass tufts rather than Ferns, and are only found occasionally in moorland dykes or similar localities.

CHARLES T. DRUERY, V.M.H.

NEW FERN STRAINS (*continued*).

Some pinnules were carefully detached, and when laid down on a glass slip and examined under a microscope they were seen to burst and scatter a fair number of spores over the field of view. Here, then, at last was afforded an opportunity of multiplying this still rare form on more liberal lines than offsets permitted, but none of the three had then the remotest idea of what that sowing would result in. In due course prothalli developed on healthy lines in both the sowings made by Mr. Green and the writer, the spores being divided. No sooner, however, had the primary fronds produced by the prothalli been followed by the second ones than a peculiar slenderness was noted in a number of the plants, and as they developed this character

became so marked that these were pricked out for special care. Eventually about a score of these were potted, and Mr. Green and myself eventually were the owners of as many extraordinarily beautiful specimens in which the parental half-inch pinnules were narrowed and lengthened into extremely slender ones, sometimes between two and three inches in length, forming fronds of inconceivable delicacy, while in some instances these pinnules were prettily expanded at their tips on almost tassel-like lines. One of Mr. Green's varied greatly by substituting for this lengthening a multiplication of the pinnules and subdivisions, so that a dense plumose form resulted, reminding one strongly of the Jones and Fox *angulares* described above.

The Royal Horticultural Society recognized the merit of two of the writer's exhibits of the "*gracillimum*" type, as he named the slender section, and of Mr. Green's "*plumosum*," by two First Class Certificates and an Award of Merit. Encouraged by these wonderful results, the writer narrowly examined his own plant, and found a large number of sporangia, or spore capsules, in twos and threes on the edges of the pinnules, and quite easily visible to the naked eye. A second very successful sowing was made of these, some hundreds of plants resulting, of which over a hundred displayed the "*gracillimum*" type, and are developing in some cases forms which promise even to excel the first batch, particularly in the tassel-like expansion of the tips, which appears not to be actual crests, but a sort of fan-like development of terminal pinnules. The parent *pulcherrimum* shows this tendency slightly. Happily, despite the delicacy of make, all the offspring have inherited the parental robustness of constitution, and several plants of the original batch now measure nearly five feet across their frondage, rendered somewhat pendulous and spreading by their great breadth and slenderness, though the parental form is of upright habit. Some of the results of these two sowings, and also the comparative

infertility, suggest the idea that the original find may be a cross between *P. angulare* and *P. aculeatum*, since some of the plants which did not present the "gracillimum" character bear undoubtedly the plainly-stalked pinnules of *P. angulare* instead of the wedge-shaped unstalked ones of *P. aculeatum*, and also show the duller surface of *angulare*. The majority of the seedlings, however, are true to the parental (*pulcherrimum*) form, so that the original object of the sowing has also been attained plus the unexpected and highly gratifying one.

Curiously enough, seedlings raised from the reversion just described for the purpose of testing whether the "gracillimum" tendency would be transmitted have yielded plants which, so far, all appear to be of *aculeatum* type rather than *angulare*, which the immediate parent resembled. They are not, however, as yet sufficiently developed to permit of certainty in this respect. Outside the three remarkable cases we have described there are, of course, minor ones. Mr. Wilson's *A. f.f. setigerum*, for instance, with its bristly pinnæ, has—whether by crossing or otherwise is not clear—contributed, at any rate, to form a bristly section of crested forms of very great beauty, though, in some cases, rather addicted to reversion. We have one plant of fine percristate type which has split into two distinct crowns, one of which bears percristate fronds of precisely the same outline and make but utterly devoid of a trace of "setigerum," a clear proof, to our mind, of reversion to a plain-crested parent. *A. f.f. Frizellæ*, also, probably in the same way, gave rise to a large number of crested varieties on diverse lines; but they, too, are notoriously given to reversion, and, there is little doubt, for the same reason. Both these types would appear to cross extra freely with others of the same species, the two conjoined types being apt subsequently to separate, a sort of reversion resulting. A marked example of this "gay Lothario" tendency is seen in Colonel Jones' *P. ang. polydactylum*, which appears to cross with any variety it is

sown with, and as it is not a thoroughbred, bearing plain non-polydactylum pinnæ on every frond and a very erratic frond tip, it has spoilt scores of good varieties by imparting its eccentricities to otherwise constant forms. The moral here is, of course, "Never sow defective Ferns," since they practically invariably transmit their defects, and, it would appear, are very liable to transmit them even when crossing occurs.

Finally, it is interesting to remember that all three of the remarkable freaks which form our main theme, were absolute surprises to their raisers. When thoroughbred forms are sown improvements of type may reasonably be anticipated, and in these days it is obviously waste of time to sow from forms which do not show some refined and distinct character. We have seen what has happened with the Axminster find of Lady Fern, and there are several other fine plumose varieties, especially the far more delicate Horsfall, which, if sown, might quite conceivably break into strains of equal or even surpassing beauty. Alliances between such a Fern and some of the refined cristate forms are also well worth trying for; but in that connection we rather advise these as separate experiments, sowings of Horsfall alone on the chance of an independent break being also made. The field for improvement, in short, is immense, but we think we have said enough to indicate not merely the possibilities, but also the right direction to pursue to realize them.

C. T. D.

BRITISH FERNS IN ART.

When we consider how largely foliage figures as a factor in artistic decoration, not merely in the living state as decorative plants, but also in architecture, pottery, textile fabrics, such as laces, curtains, tablecloths, etc., etc., and in many other ways, it seems a thousand pities that the many beautiful variants of our native Ferns should not be studied

and utilized in similar ways. In architecture we see how a simple plant like the *Acanthus* has been conventionalized to form the beautiful capitals of the Corinthian order, and in Oriental architecture the Lotus and Papyrus form the pervading inspiration. Renaissance decoration, with its complicated scroll work and incongruous admixtures of conventionalized animal, human, and foliaceous twists and twirls, also owes much of its beauty to its imitations of climbing and clinging tendrils which are used to knot the designs together. In our household textiles, draperies, and linen, and in ladies' artistic costumes, we see the vegetable kingdom largely drawn upon by the designers for both floral and foliage decoration, but where the fern fronds are utilized, it is rare indeed to find them other than purely conventional, so that even the experts can seldom determine even the species. The same remark applies to ceramics generally, only now and again do we come across true representations of Ferns, but never, so far as our own experience goes, do we find the far more ornate varieties profited by to enhance the beauty of the designs. We can, however, easily conceive that a surpassingly handsome dessert service could be devised, ornamented with judiciously selected fronds or portions of fronds of the *élite* of British Fern varieties, tasselled, frilled, fringed, or otherwise diversified. Lace curtains, too, instead of unmeaning conventional scrolls and so-called shells, etc., could be rendered both more interesting and more beautiful if some of the choicest Fern fronds were introduced on graceful lines, and the remark applies to all lace-like textiles in which foliage designs are introduced. Carpets, rugs, and tapestries all admit of profitable application of Fern patterns, though we admit that a fern lover would be apt to consider it sacrilege to tread upon a carpet or rug representing his favourites, though no one feels the incongruity of doing so upon the floral gems which these domestic articles so often display.

Years ago the writer's wife, profiting by access to his Fern collection, made a considerable number of beautiful

table mats, large and small. On a basis of white satin portions of carefully dried fronds of the best varieties were tacked and then covered with very fine muslin, also tacked unobtrusively so as to keep the fronds flat and free from damage. A fine lace edging completed the work, and with care these most beautiful ornaments for the table have lasted undamaged for years, and still exist in the possession of old friends as cherished mementoes. The fern fronds were so arranged as to permit of doubling the material here and there, and as proper drying ensures the retention of the normal green colour indefinitely, time has made no difference in this respect. Here, at any rate, is demonstrated the possibility of producing something permanently beautiful and useful by any lady who can obtain the needful material.

C. T. D.

A REGAL OSMUNDA.

Osmunda regalis, the Royal or "Flowering" Fern, is I fear a diminishing quantity. At any rate I know of districts where it used to grow which to-day know it no more. On the other hand, I am pleased to observe that in this neighbourhood (Studland) it is on the increase, although of this fact the "Flora of Dorset" (1895) is discreetly silent. It is rather a curious coincidence that 1895 was the year I first became acquainted with the specimen in question. Since then I have visited this stately Fern several times, and last year took its photograph and dimensions. The former is unsuitable for reproduction, as although I watched and waited for fifteen minutes, I could not catch the plant in a quiescent condition. Only a photographer can appreciate fully these quiet forces of nature which so often operate—especially by the sea-side—to render his efforts nugatory. However, the dimensions still stand, and are:—Caudex, or crown, $8\frac{1}{4}$ feet in circumference; this crown was $2\frac{1}{2}$ feet above the soil, while the average length of the fronds,

which were numerous, was about $6\frac{1}{4}$ feet—many were $6\frac{3}{4}$ feet. Thus this “flower-crowned Prince of British Ferns” in height *and* diameter equalled about $9\frac{1}{2}$ feet—hence probably its immunity from disturbance. I doubt not there are finer specimens, but this plant, by virtue of its elevation on an oozy bank, one has—apart from its dimensions—to look up to it, and thus its regality is considerably enhanced. I remember many years ago coming across two of these majestic Ferns at Keswick, one on either side a cottage door—and the remembrance is still clear and well-defined. At one time this Fern grew on Hampstead Heath, as witness “Gerarde’s Herbal” of 1597.

He says:—“It groweth in the midst of a bog, at the further end of Hampstead Heath from London, at the bottom of a hill adjoyning to a small cottage, and in divers other places.” We have to content ourselves with “divers other places,” and, forsooth, to go to Ireland to see it in its greatest luxuriance.

Only recently Mr. Phillips, of Belfast, sent me spores of a variety of this, which have been duly consigned to mother earth; but as this is a slow-growing Fern some time must elapse before success can be chronicled by

C. B. GREEN.

POLYSTICHUM ANGULARE PLUMOSISSIMUM.

The great varietal possibilities of the species *polystichum* are really marvellous. If we take one section—the *plumosums*—and compare the best known of the *divisilobums*, *decompositums* and *stipulate* forms with the normal wildlings, the difference in favour of the former can truly be described as wonderful. What shall we say, then, of that erstwhile peerless *plumosissimum* raised by Messrs. Birkenhead, of Sale, some years ago, and which is figured in the “Book of British Ferns,” on page 76? The frond

there shown hanging down the side of the pot was indeed feather-like in its lightness and fulness. Good as this reproduction is, much of the detail is lost in the process. The full beauty of its mossy development is more apparent in the original stereograph*; in this the thousand little tongue-like extensions are clearly seen, and the depth of the feathery development more fully realized. Unfortunately, but few of your readers ever saw this plant, and it may be interesting to mention that when the above-mentioned stereograph was taken the little tongue-like divisions of the pinules were still growing and had assumed the thin texture and paler green tint peculiar to apical apospory. I ventured to suggest this to the Messrs. Birkenhead, and shortly afterwards some of the material was placed under culture both at their own and Mr. Stansfield's nurseries. Unfortunately, while these cultures were developing the parent plant died, but as quite a number of youngsters had resulted from the cultures, we hoped to see the glories of the original reproduced in the offspring. Alas! the hope, so far, has not been realized, for while the plants have been in most cases fine examples of plumose development, they have not, so far as I know, produced the long tongues ending in apospory which was such a striking characteristic of the original plant.

The parent of Birkenhead's plumosissimum is a matter of doubt. The raisers thought it was a sporeling from *P. ang. decorum*. Doubtful as this may seem, any of your readers who can secure spores from *P. ang. decorum* might try to repeat Messrs. Birkenhead's success by raising an experimental crop.

P. ANG. PLUMOSISSIMUM PELLUCIDUM STANSFIELD.

It has been my good fortune on several occasions during the past few months to have seen and feasted my eyes upon

* If any of our members would care to see the original stereograph, and will send me their addresses, I will try to arrange to send it round

a batch of plumosissimums that recall all the best features of that of Birkenhead's, and, in a few cases, are even superior to it. The batch referred to have been raised by Mr. H. Stansfield at Sale. When I first saw them I thought that Mr. Stansfield had recovered the glories of Birkenhead's plant in some of its own offspring, but I soon found that such was not the case. They are indeed a batch of sporelings from a distinct source known, I believe, to the raiser. They possess in nearly every case the plumosissimum character to perfection, and are all characterized by the subdivisions of the pinules being much elongated and tongue-like. Some of them have already produced prothalli by apical apospory; bulbils are also produced by some of them pretty freely, so that we may fully expect the perpetuation of their fine characters. A few of the best of them have a decidedly pellucid appearance, and these have been named *P. ang. plumosissimum pellucidum*.

The pinnæ are broad with a rounded apex, are beautifully imbricated and subdivided to a remarkable degree, all the subdivisions, or tongues, also terminating in a rounded apex and running out in some cases to a great length, the mature frond resembling in its fulness an ostrich plume. In fact, one wonders, after seeing these gems, whither plumose development can further go.

The Sale nurseries have enriched our ferneries with many good things, and Mr. Stansfield is to be congratulated upon this further striking success.

JOE EDWARDS.

“BRITISH FERNS AND THEIR VARIETIES,”

By Charles T. Druery, V.M.H., F.L.S.,

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